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Several pages spotted with stains, especially in Vol. II, nos. 43-45.

THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

EDITED BY

WILLIAM CROOKES, F.C.S.

VOLUME I.

"Nulla recordanti lux est ingrata."—MARTIAL.

LONDON:

CASSELL, PETTER, AND GALPIN, LA BELLE SAUVAGE YARD,

LUDGATE HILL, E.C.

1859.

LONDON:
PETTER AND GALPIN, BELLE SAUVAGE PRINTING WORKS,
LUDGATE HILL, E.C.

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 1.—*September* 10, 1858.

INTRODUCTORY ADDRESS.

THE title we have chosen for this publication will, we hope, be sufficiently explicit to indicate our design; yet, in our first number, we feel anxious to explain as fully as possible the nature and scope of the "PHOTOGRAPHIC NEWS."

Photography has undoubtedly attained to the dignity of a Science; and among the marvels of this age of discovery, there are perhaps none so great as those that are associated with this art. The pagan nations of antiquity worshipped the sun, whose genial warmth impregnated nature, and clothed the hills with verdure, flowers, and fruit; but we have learned a wiser lesson; we have scientifically utilised the object of pagan worship, and made his golden rays subservient to the purposes of an artificial life. Philosophers have yet to discover "What is electricity," though practical minds have already harnessed it to a girdle that encircles the globe, and bid it bear with lightning speed our thoughts and wants across vast continents and beneath intermediate seas. Its elements and attributes are not defined; but, nevertheless, its work is ascertained, and this mysterious agent is pressed into the service of mankind. So chemists have yet to analyse the sunbeam, and tell us accurately what it is; but practical philosophers have already made it a willing and obedient servant. It paints for them pictures instinct with life and beauty, and with a fidelity so true that art cannot imitate it. Thus does it convey new lessons to the disciples of science, and inspires her votaries with purer and simpler tastes, and with loftier aspirations after proximate perfection. This faithful but somewhat capricious servant may now no longer resist the power of the human will, for Niėpce de St. Victor, the modern Laputan sage, has taught us how we may store the sunshine in our cellars, and in a moment release it from imprisonment, amid the profound darkness of the night, to fix with delicate and perfect accuracy a living memorial of endeared objects. Those wonderful agents, steam and electricity, readily obey the wand of the modern magician, and effect an immediate realisation of human desires; but no discovery can compare with this, the last and greatest acquisition that the bold hand of science has snatched from the secrets of nature. And yet new mines of undiscovered wealth invite the enterprising disciples of this, as of every other science. The exhaustless stores of nature are unfolded to us only as pressing wants urge on adventurous spirits to ransack her boundless resources.

To encourage and sustain such enterprise is the object contemplated in the establishment of the "PHOTOGRAPHIC NEWS." We have carefully studied the subject, and are convinced that such an organ is imperatively necessary to meet a palpable demand.

The features which will distinguish the "PHOTOGRAPHIC NEWS," and render it the most valuable medium of information, not only to professed photographists, but also to all who are interested in the development of science, will be—

I. Under the head "Notes and Queries," replies to correspondents who may seek information on photographic and other scientific subjects of a kindred nature.

II. Information, derived from foreign as well as domestic sources, of all discoveries and improvements in photography, optics, photographic chemistry, and other cognate sciences.

III. Elementary lessons in photography, together with a dictionary of photographic terms.

IV. Reviews of books on photography and its kindred sciences, and critical notes of exhibitions of photographs and other works of art.

V. Reports of the transactions of English and foreign photographic and other learned societies.

The "PHOTOGRAPHIC NEWS," as the recognised organ of photography, will be the guide and instructor of the beginner, the medium of communication and interchange of ideas between more advanced students, and the record of all improvements and discoveries which may take place in the art, or in the allied sciences of optics and chemistry.

We will not dwell any longer upon the importance of the task that we have undertaken, but will address ourselves carefully to the work, relying on the generous indulgence, and on the liberal patronage of those whose interests we are endeavouring to promote and to secure. We are aware, that in undertaking to smooth the rough path of investigation and experiment, we accept serious responsibilities, but we are sustained by a firm reliance on the varied talent which has been placed at our disposal, and on the abundant resources that we possess. We do not, therefore, doubt our power of rendering our performances equal to our promises.

Optics.

HOW TO CHOOSE A LENS.

Mr Editor,—In commencing a series of short communications on the practice of photography suited to your periodical, a difficulty presents itself in the general arrangement of the subjects, owing to the importance, or rather necessity, of making each paper, as far as possible, complete in itself, as well as intelligible without continual reference to former ones. Especially must we provide against its being dependent upon those that are to follow. Perhaps this difficulty is best met by a subdivision of the various items to be treated of, taking each, firstly, in *its most simple form* or condition, and subsequently, and in succeeding chapters, dealing with the more complicated cases.

Adopting this course, at least for the present, and selecting *the choice of a lens* for a subject, let us proceed to consider the same in its most simple form, viz., where that choice lies between two or more lenses of *the same* (or very nearly the same) *focal length and aperture*.

Such a selection is not unusually the first difficulty of any importance which the tyro in photography encounters. Chemicals of good quality he can now readily procure in almost all localities; a camera, suited to his wants, with nearly the same facility; and even if the latter be a little rickety, he can use it *with tenderness;* or, should it be leaky (of light inwards), the chink may be stopped, or a cloth thrown over during work; while an indifferent lens can only be remedied by substituting another of better quality. To choose, therefore, in the beginning a good lens, or the best of several (the lower priced lenses, nominally the same, often differ exceedingly in quality), is important to the beginner.

To expect that the tyro in photography can adopt, with any certainty, the usual recommendations to choose his lenses by actual photographic trial, is to expect at his hands that for which long experience alone can qualify him. Fortunately there is a method little recognised, but more generally certain, and involving no necessity for previous photographic experience. Its correctness depends upon the fact, that all lenses producing good visual images are capable of producing good photographic ones; while lenses incapable of affording either are incapable as to both. This is of course to be understood in every case of equal apertures.

In the selecting of a lens from several of the same calibre, therefore, whether the party be a mere tyro or an adept, let him begin by examining their *visual* images, recollecting that the great aim of the photographer should be to select that lens which combines, what photographers usually term, a large field with the greatest distinctness throughout—the picture, visual or photographic, being assumed to be received or taken on a plane surface.

Now, should it so happen that in selecting a lens we can place the camera at a good distance (say fifty times or more the focus of the lens), and directly opposite to a long and even line of buildings, an important object will be gained. Such a subject is, however, of rare attainment, and can be altogether dispensed with by proceeding as follows:—

Procure, with the lenses to be examined, two cameras, and attaching to each of these one of the lenses, place one of the cameras on a tolerably level surface (a table for instance), and over it the second camera; draw one vertical and central line with a pencil on the greyed glass of each camera, and bring the image of any small, well-defined, and well-lighted object, not too near (twenty times the focal length of the lenses will be sufficiently far), to coincide with the lines marked on the glass, and carefully adjust each camera to the best focus for the selected object; then, turning both cameras, *by laying hold of the under one*, cause the images to pass from the centre of the field to any desired distance right or left in both cameras (taking special care that no disturbance of the upper or under camera occurs). Observe the relative indistinctness thus produced. If a difference exists, such will of course be more apparent as the images are caused to recede from the centre of the field; and should it be required to compare more than two lenses, then, retaining the better of the first pair, proceed to try a third lens with it, and so on.

Should the second camera not be procurable, proceed as follows:—Draw three vertical lines on the greyed surface; one central, the others near the extremes of the field, and equidistant from the centre; adjust the focus carefully as before, the image of the selected object being at the centre line. Mark the then position of the lens in the tube in which it slides. Turn the camera (keeping the lens, if the object be rather close, over nearly the same part of the table) until the image is brought to one of the lateral lines marked on the greyed surface. Adjust the focus again, and mark the new position of the lens in the sliding tube. Take, for accuracy's sake, a mean of several such focusings, using at one time the position to the right, and at another to the left of the central one (for the lateral images are usually uncertain to focus for, especially in view lenses). The distance between the two marks so obtained, is the measure of the departure of the lens from a flat field for the distance between the central and lateral lines marked on the greyed surface; and, this being noted, the same process is to be repeated for each lens to be examined; and that lens of the series which differs least in the so measured foci of its central and lateral pencils, is to be selected as giving the flattest field; and, should it give an equally distinct image at the centre of the field as the others, is decidedly to be preferred.

In concluding, it may be observed, that the foregoing method of trial has the following advantages:—1st. Of simplicity. 2nd. Of being available to all, and under all circumstances, even at night in a long room. 3rd. Of requiring neither previous practice in photography, nor any apparatus, save that of the camera itself. 4th. As testing those defects which are most likely to be met with in excess both in the portrait and landscape lens. And, lastly, that the method of trial is such as to remove all difficulty and uncertainty as to the angle of the field for which we are testing the lenses now under trial—the trials being understood to be comparative ones, and the angles, under which the lenses are tested being, whether the two cameras, or but one such are used, identical.

face uppermost. Have ready prepared some perfectly dry lampblack and a pellet of wadding, and now dip the wadding in the lampblack and pass it lightly over the surface of the paper. Nothing will appear at first, but if during the time the lampblack is passing over, the sheet be equally breathed upon, the unchanged citrate of iron will absorb the moisture and the carbon will adhere to the surface whilst passing over it, and some of the details will appear visible. Now breathe on it a little more, and brush the lampblack again over the surface, when new details will come out; the operation is to be stopped when the carbon has been applied a sufficient number of times to bring out all the fine detail and half tones of the picture.

The proof is fixed by immersing it very carefully into a bath of filtered common water, quite free from dust or dirt on the surface. The citrate of iron which has not be endecomposed by the sun will dissolve, and there will remain a positive picture, the blacks of which are produced by pure carbon, and which consequently is unalterable by any chemical agent. It can be dried and gummed, or varnished on the surface, if desired, and it will be finished.

This process does not differ in principle from those of Mr. Pouncy and M. Testard de Beauregard, except in the substitution of citrate of iron for bichromate of iron, and in the mode of working. We much doubt whether it will ever be possible by these processes to obtain really perfect pictures that will bear comparison with actual photographic positives, and give all the half tints and sharpness of detail. The first proofs, however, which were presented to the French Society are very satisfactory. COSMOS.

PHOTOGRAPHY IN ALGERIA.

MY DEAR SIR,—Presuming that the first number of the——I must wait until I receive it before I can give it the denomination by which you distinguish it——is already on its way here, I propose to forward you information of my proceedings in this colony as frequently as possible, in the hope that your readers may derive some amusement, if not instruction, from a perusal of such portions of my letters as you may consider best calculated to effect that object; only stipulating that, as I am a stranger in a strange land, and therefore likely to fall into errors which may place me in a ridiculous position, my name shall not be published. . . . .

Of the two objects that prompted my journey hither, viz., the improvement of my health, and the desire to visit and bring away photographs of scenes where events had occurred familiar to us from our school days, I have been successful only in the latter. I had been told so much of the warmth and genial climate of Algeria, that when I woke the morning after my arrival and found it dull, cold, and raining with that steady, incessant downpour which is associated in the minds of most of us with the recollection of a pic-nic party, I began to think I had been humbugged. For three days it never, as far as I am aware, ceased to pour down in the same uncompromising style, and I had already commenced inquiries as to the speediest means of reaching Alexandria, when it suddenly ceased, and I was enabled to traverse the streets and take note of buildings and other interesting objects with a view to future operations; and was gratified to find that I should have no lack of subjects. In the older part of the town the houses are lofty, and the width of the streets so trifling, that it would not be difficult for an active man to jump from a house on one side of the street into its opposite neighbour. I was not a little struck on returning to the more frequented parts of the town at the Frenchified appearance of everything. The shops were full of French goods, and Frenchwomen stood behind the counters, while the husbands of at least a good many of them were to be found among the tightly-belted, blue-tunicked, pegtop-trowsered individuals who pervaded the streets in every direction—proving how largely the military element enters into the composition of the population of Algiers. Cafés and restaurants are numerous, and are mostly kept by Frenchmen, although some of the former are held by Arabs. I entered one kept by an Arab,—a poorly-furnished room, lighted by one window, from which window I was told Jules Gerard dropped the native who had ventured to speak in contumelious terms of Frenchmen in general, and Gerard in particular, upon a heap of what I may in mild terms describe as refuse. . . . .

I was wandering alone outside the town, when my attention was attracted by a superstructure, the object of which was so evident that I looked round for a soldier of whom I might inquire the nature of the crime committed by the individual destined to have his career brought to such an abrupt termination. I soon found one, and, thanks to six months of "Cassell's French," and some little practice, I was enabled to comprehend the following narrative:—A man named Gilson inhabited a house a short distance from the town, together with his wife, her mother, a daughter about sixteen years of age, and another some years younger. One night about ten o'clock they heard a wagon drive into the yard, and a peculiar sound which a boy in Gilson's service, absent on some domestic errand, was in the habit of using for the purpose of gaining admittance, made the family suppose that he had returned. The mother opened the door, and several Arabs immediately rushed in, cut down the mother, and then murdered Gilson and his wife, whose bodies were hacked in a dreadful manner. The youngest daughter concealed herself behind a large barrel, from whence she could see all that was done, and was thus enabled to give a description of the murderers, one or two of whom were known to her, which led to their speedy apprehension. The eldest daughter darted out of the house at the instant the ruffians entered; but was pursued by two of them, who caught her, chopped off her hands at the wrists, and otherwise mutilated her in an indescribable manner; and, finally, one of them, with the intention of killing her, made a downward cut at her head, which nearly cut away the forehead from the skull, and left her, to all appearance, a bleeding corpse. Wonderful to relate, she did not die, and has since been conveyed to Paris, where she remains at this moment; her unfortunate condition but slightly alleviated by the receipt of a sum levied on the goods of the murderers. The object of the Arabs in this attack was plunder; Gilson having somewhat boastfully, though on the supposition that he was communicating with a friend, showed one of

the criminals some valuable articles of jewellery. The day following the little girl was taken into the town to the magistrate, to whom she gave the names of at least two of the murderers, whom she had frequently seen with her father at his house. One of these men was a sheikh, and comparatively rich. Other arrests were also made, and eventually one of the persons arrested made a confession, upon the strength of which seven Arabs were placed on their trial, all of whom were convicted and sentenced to death—the informer being subsequently spared.

I had no sooner heard this horrible tale than it occurred to me, that if I could get permission to establish my apparatus in a suitable position, the execution would form the subject of an interesting photograph. The execution was fixed for an early hour on the following morning, so that I at once hastened to the prison, and obtained the name of the officer appointed to command the troops who were to guard the scaffold, and from him I obtained the necessary permission to establish myself on the spot most suitable for the purpose. To avoid the possibility of exciting the feelings of the natives in any way, I determined to conduct the operation with as much secrecy as possible. With this view I hired one of the light wagons used for crossing the desert, and, with the aid of a couple of tarpaulins, soon contrived a somewhat capacious operating room, in which I placed all the requisite apparatus. By the time I had made these preparations it was necessary to start for the scene of the execution, as it was certain that an immense crowd would assemble in front of the scaffold. It was but a little past midnight when I arrived on the spot, yet even then the driver had some difficulty in making his way through the mob. Having ascertained, by means of my compass, the direction from which the rays of the rising sun would fall upon the scaffold, I placed my wagon accordingly; and then, with the self-satisfied feeling of a man who has sacrificed his personal convenience to the interests of his profession, I lighted a cigar and moved into the open air, more with the object of preventing any attempt on the part of the natives (who are great thieves) to cut a hole in the tarpaulins than of admiring the beauty of the night. . . . .

The crowd of men was immense; and as the rays of the rising sun fell upon their upturned, swarthy faces, it was painful to see the earnest and even frightened expression of their countenances. I had been present not long before at an execution in France, which thousands had assembled to witness; and the recollection of the jests and laughter I had then heard made the dead silence on the present occasion more impressive. I at first thought that this silence was owing to the number about to be executed, yet I could not reconcile this interpretation of it with the reports I had heard of the indifference of the natives to human life. I asked the driver of the wagon if such silence was usual, and learned from him, half a native himself, the reason. The Arabs are followers of Mahomet, and believe that their bodies, after death, will, by means of the tuft of hair they leave on their otherwise shaven heads, be conveyed by their prophet into paradise. Now, the head, which is completely separated from the trunk by the action of the guillotine, can alone, according to their belief, be placed in paradise, and as the body must be left on earth, they conclude (what is perfectly natural, seeing the nature of their paradise), that this arrangement will not contribute much to the owner's gratification. [I have since heard, that when the native chiefs executed a man by cutting off his head, the executioner invariably left it attached to the body by a bit of flesh, with a view to obviating the inconvenience referred to above.]

I purpose, in a future letter, giving you a detailed account of my photographic apparatus and arrangements for taking instantaneous pictures; it may, however, be interesting to your readers to know that I used on this occasion a stereoscopic camera with twin lenses. The process, of course, was collodion, some of Hardwich's make, and the bath contained glycyrrhizine in small quantity, to which the marvellous sensitiveness I attained in some of my pictures may be attributed. My lenses (view) were $\frac{7}{8}$ of an inch in diameter, and $3\frac{3}{4}$ in. focus;—a pair of *Grubb's* exquisite little productions, and the aperture was of the enormous size of $\frac{5}{8}$ of an inch, nearly the full aperture, and I can assure you, that even then they worked very sharply, and as rapidly as a good portrait combination. Part of the day before I had been busily employed in fashioning an instantaneous movement for uncovering the lenses; and, considering that the only available tools were those which were to be found in my portmanteau, I think I succeeded remarkably well. The stop was not quite as good as if it had been turned out of one of your London shops, but it worked to perfection, and being composed of cardboard, sewing cotton, and pins, it was lighter, and consequently more mobile than brass. My ambition was not merely to obtain a picture of the instrument of death, that I could have got any time, but to test to the utmost the wonderful powers with which I fancied my arrangements were endowed, by taking the moving objects actually *in transition*—the head in progress of falling into the basket, or the sharp blade in the midst of its descent. How well I succeeded you shall have an opportunity of judging as soon as I have time to print off a copy of the negatives.

. . . . The criminals were not brought on the scaffold together, but led up one at a time. The first was the sheikh, who seemed perfectly indifferent to his fate. So rapidly was he bound to the plank and thrust under the axe, that I had barely time to insert the plate-holder and get the instantaneous movement into order before the sharp edge descended, and his head rolled into the basket. This picture was quite successful, and so was the second, but the third presented a dim appearance, the fourth was nearly, and the fifth and sixth were wholly, invisible. How to account for this I know not, unless the atmosphere around the scaffold became in some way affected by the blood, the odour of which was distinctly perceptible to me. Perhaps some of your readers may be able to suggest the reason. . . . .

. . . . My letter has reached such a length that I have neither time nor space at present to tell you of a rather serious difficulty in which my photographic ardour was nearly involving me with the friends of the deceased. It is all over now, however, and I have still a whole skin, although, it must be

confessed, "more by good luck than good management." Perhaps I may devote the next rainy day to an account of my adventure, for the edification and warning of such of your readers as may be tempted to wander amongst a half-civilised tribe in search of food for the camera. Yours truly,

C. A.

Photographic Chemistry.

It is not our intention to write a complete treatise on chemistry, but only to treat of that science in its connection with photography.

All bodies are simple or compound; the number of the former being reckoned at sixty-two.

A simple body or *element* is one which cannot be decomposed by any known process. A compound body is one composed of two or more distinct substances, which can be separated from each other; which is then said to be reduced to its elements.

Whether simple or compound, all bodies are formed of an assemblage of particles or molecules infinitesimally small, each of which possesses the same properties as the entire body. These particles are held together by a force which is termed the *attraction of cohesion*—a force which varies in intensity according to the nature and conditions of bodies; thus it is especially apparent in solids, less so in liquids, and not at all in gases. Water furnishes an excellent example of all three conditions: as a solid in the form of ice; as a liquid in its ordinary state of water; and as a vapour in the form of steam.

In chemistry, when two bodies possessing different properties combine in fixed and definite proportions to form a third body, possessing properties different from either, there is said to be *combinations*. Thus metallic silver and iodine, which, in their simple state, are unchanged by the light, when combined so as to form iodide of silver, are acted upon by light almost instantaneously.

A mere mechanical *mixture* must not be confounded with a *combination;* in the former cases, each of the bodies remain distinct and unchanged.

Certain bodies possess the property of reddening blue litmus paper, and have a sharp taste. These are termed *acids*, as sulphuric acid, nitric acid, &c. Potassa, soda, and other bodies having the contrary power of changing the red to blue, are termed *alkalies*. If one of these acids be mixed with one of the alkalies in a certain proportion, both are *neutralised;* that is to say, they lose their peculiar properties, and no longer affect litmus paper. A new substance is the result, which is termed a *salt*. There are other substances which, though they do not act upon litmus paper, yet combine with acids, and produce a salt; these are termed *bases*—a term which also includes the alkalies.

Without entering too minutely and unnecessarily into the details of the science, we may here state that the simple bodies or elements are capable of being divided into two broad divisions, each having several properties in common, and likewise possessing a great affinity or tendency to unite with bodies of the opposite class. These two divisions are *metallic* and *non-metallic*.

These names almost explain themselves. In the first class are included all those bodies which possess the peculiar lustre, appearance, and chemical properties which belong to the metals. Silver, iron, copper, tin, as well as the more rarely seen potassium, sodium, calcium, &c., are examples of this class.

The *non-metallic* bodies comprise the remainder—chlorine, iodine, sulphur, oxygen, &c., are elements belonging to this second class.

We stated above that elements of the one class possessed a great *affinity* for those of the other class—non-metallic or metallic. They do not, as a rule, show such marked liking for any of their own class. Oxygen, however, is an exception to this. This element has such powerful affinities, that it enters readily into combination with almost every one of the other elements, irrespective of class, and forms with them well-marked chemical compounds.

Although oxygen is capable of uniting readily with elements of either division, yet the resulting compounds show, in a most marked and decided manner, their parentage. Thus the compounds of oxygen with those of its own class—the non-metals—are mostly possessed of acid properties; whilst its union with the metals gives rise to bodies having *alkaline* or *basic* properties. These will be again alluded to further on.

Hydrogen is an element which forms an apparent exception to the broad rule of the greatest affinity existing between elements of opposite classes, as its most marked compounds are formed by its union with those of its own class. In this case also it gives rise to compounds having acid properties, when it unites with several of the non-metals; thus, by combining with chlorine, the well-known substance hydrocloric acid, formerly called muriatic acid, is produced.

(*To be continued.*)

Dictionary of Photography.

Aberration.—A deviation in the rays of light when refracted by passing through a lens, by which they are prevented from uniting at the same focus. Aberration is of two kinds—*spherical* and *chromatic;* the former arises from the shape of the lens, and the latter from the unequal refrangibility of the various colours of which light is compounded. *Spherical aberration* is owing to the following cause:—Let us suppose that the lens under examination is plano-convex, that is to say, a lens which has one of its surfaces plane and the other spherical, and let the plane surface be turned towards a luminous body, from whence issue parallel rays of light; these rays will, after passing through the lens, be converged to a focus; but the focus of those rays which pass through the very margin of the lens will be at a point much nearer the lens than the focus of rays which pass through the central portion of the lens. The distance measured between these two focal points is called the *longitudinal* spherical aberration; and the diameter of the luminous halo, which the rays passing through the outer parts of the lens would form around the more distant focus of the central rays, is called the *lateral* spherical aberration. In a *plano-convex* lens, with its plane side turned towards parallel rays, as in the above example, the spherical aberration will be $4\frac{1}{2}$ times the

thickness of the lens. If, however, the convex side of the lens be turned towards parallel rays, the aberration is only 1·17 times its thickness. In a double convex lens, with equal convexities, the aberration is 1·67 times its thickness. The lens which has the least spherical aberration is a double convex one, whose radii are as 1 to 6, and whose most convex face is turned towards parallel rays—the aberration is then only 1·07 times its thickness.

As the rays which pass through the marginal parts of a lens are refracted too much in comparison to the central rays, it is evident, that if the curvature were made to diminish gradually from the centre to the margin, the spherical aberration would be entirely removed. The ellipse and hyperbola are curves of this kind; and, since the curious discovery by Descartes of this property of lenses whose curvatures are elliptical or hyperbolical, philosophers and opticians have exerted all their ingenuity to construct lenses with surfaces of these curvatures; but the mechanical difficulties to be overcome are so great, that hitherto optical instruments have only been constructed with lenses having spherical surfaces.

It is, however, possible to get entirely rid of the spherical aberration by combining two or more lenses, and making opposite aberrations correct each other; and Sir J. Herschel has described several combinations of the meniscus (or concavo-convex) with the plano-convex lens which possess this property. Professor Petzval has recently introduced a new form of photographic lens for landscape purposes, in which the spherical aberration is nearly corrected by means of the addition of a *concave* lens to the ordinary view lens; and Mr. Grubb has also lately patented an improved construction possessing the same important advantages. It is a cemented compound lens, having only two glasses, whilst the curvatures are so adjusted that the spherical aberration is nearly corrected, thereby affording an image as distinct as that given by the old lens, using a considerably increased aperture of the new. This is an important advantage over the Petzval form of lens, as the addition of two lenses and four surfaces must make the latter combination much slower in its action for similar apertures and foci than the ordinary view lens.

Chromatic aberration will be explained under the head of Achromatism.

Absorption of Light.—When light passes through even the most transparent substance, some of the coloured rays of which it is composed are arrested, in quantities varying according to the nature and degree of opacity of the interposed medium. The transmitted light, supposing the colour originally to have been white, will now be coloured—the unabsorbed rays only reaching the eye. All transparent bodies exert some absorptive influence on light, and a knowledge of some of the principal facts in this subject will be found of the greatest use to the practical photographer. Even the most transparent bodies in nature, air, and water, when in sufficient thickness, are capable of absorbing a great quantity of light. This absorptive power of air is principally exerted upon the chemical or actinic rays of light, and is one of the causes of the greater rapidity of all photographic operations during the summer months, when the sun, rising daily to a considerable height in the heavens, shines down upon the earth less obliquely, and, consequently, through less thickness of atmosphere. There are few instances of substances absorbing all colours equally. Common black ink mixed with water is almost the only liquid possessing that property; and it has, on this account, been applied by Sir W. Herschel as a darkening substance for obtaining a white image of the sun.

Unfortuntely glass exerts a strong absorptive action upon the actinic rays of light—specimens, nearly colourless to the eye, being sometimes opaque to the chemical rays, the slightest yellow tinge being sufficient to cause an absorptive action.

In choosing a lens, the colour of the glasses of which it is composed should be noticed. This is best done by placing the lens on a sheet of good white paper, and observing the colour of the paper through it. If there be a yellow or green tinge, the lens will be likely to be slow in comparison with one having a whiter colour.

In the choice of substances for intercepting the active rays for the dark room, a knowledge of the absorptive properties of various yellow media is very necessary. Yellow calico is most frequently employed. This is, however, a very imperfect and unsafe material for such a purpose. One layer, it is well known, allows white light to pass through; consequently an increase in the number of folds merely diminishes the amount of transmitted white light, and in the same degree obstructs the illuminating yellow light.

Yellow tammy, a woollen fabric extensively employed by upholsterers, is very superior to yellow calico. The colour is deeper and more vigorous, and therefore fewer layers will suffice. It is, besides, not so liable to fade through constant exposure to light—an advantage which will be appreciated by photograpers in great practice. When it is required to obstruct *permanently* the active rays from a room by means of a yellow medium, other materials may be found more appropriate than either of the above. Pasting a double thickness of yellow paper entirely over the window panes is a very good and economical plan, and the one of all others which gives least trouble. More working light may, however, be obtained with equal safety by glazing the window with orange glass; or, if a small window only is employed, by interposing a large upright glass bath full of a saturated solution of yellow chromate of potassa. Either of the above plans may with confidence be adopted.

(To be continued.)

Time beaten by Electricity.—In the exchange of messages through the Atlantic cable the same singularities are noticed that were pointed out in the direct correspondence between Constantinople and London. The difference of longitude between St. John's, Newfoundland, and Valentia, in Ireland, is an arc of forty-two and a half degrees, or two hours forty-five minutes of time; and, consequently, a signal sent from Newfoundland at 8h. 25m. in the evening, would be received at Valentia at 11h. 15m., as if it had been sent in the night. On the other hand, if the message were sent from Valentia at 11h. 15m. at night, it would be received at Newfoundland at 8h. 25m. the same evening! If a telegraphic message were to be sent direct from Paris to New Orleans at three o'clock in the morning of the first of January, 1859, it would arrive at New Orleans at nine o'clock in the evening of December 31, 1858!!

A Catechism of Photography.

I.—DISCOVERY OF PHOTOGRAPHY.

Question.—What is photography?

Answer.—Photography is the art of obtaining pictures, upon prepared surfaces, by the agency of light. The name given to the art is a compound of two Greek words, and signifies writing or drawing by light.

Q. Who was the original discoverer of photography?

A. The honour of the original discovery belongs perhaps equally to natives both of France and England; but those who first reduced the art of photography to anything like completeness, were Mr. Fox Talbot, in England, and MM. Nièpce and Daguerre, in France.

Q. Were not the principles of the art known previous to the discoveries of these gentlemen?

A. They were. It was long known, for instance, that *horn silver* would turn black if exposed to the light, and that the blackness was vivid just in proportion as the rays of light which occasioned it were powerful.

Q. What is *horn silver?*

A. It is a preparation of silver, discovered by the alchemists in their fruitless attempts after the philosopher's stone, and is now called the chloride of silver. They observed, that when exposed to the light, this preparation changed to violet, and ultimately turned black.

Q. Could any photographic effects, similar to those which are now obtained, be produced by this agency?

A. In some degree such effects were easily produced. An engraving, placed upon paper covered with chloride of silver, and exposed to the sun's rays, leaves an inverse impression upon the prepared surface.

Q. In what manner is this effect produced?

A. That part of the paper covered by the engraving is preserved from the direct action of the sun's rays; where the paper on which the engraving is printed has retained its semi-transparency, the prepared surface is slightly obscured, the result being, that the impression taken on the prepared surface is the exact opposite in form and shade from the engraving—the light parts dark, and the dark parts light.

Q. What other discoveries were made in photography previous to the researches of Talbot and Daguerre?

A. Mr. Wedgewood, the porcelain manufacturer, obtained some success in his photographic investigations, as did also the illustrious Sir Humphry Davy. Wedgewood attempted to secure pictures by means of the camera obscura; and Sir Humphry Davy endeavoured to copy small objects by a solar microscope, but neither of these efforts were attended with any considerable success.

II.—THE CAMERA OBSCURA.

Q. What is a camera obscura?

A. A box fitted with a lens, through which the images of exterior objects are received, and transmitted to a piece of ground glass, placed at the back of the camera.

Q. By whom was the camera invented?

A. By Giovanni Baptiste Porta, a Neapolitan physician, about two centuries ago.

Q. What suggested the invention?

A. The discovery that if light were admitted through a small hole into a darkened chamber, all the objects without, from which reflected rays could reach the hole, would be pictured on the opposite wall.

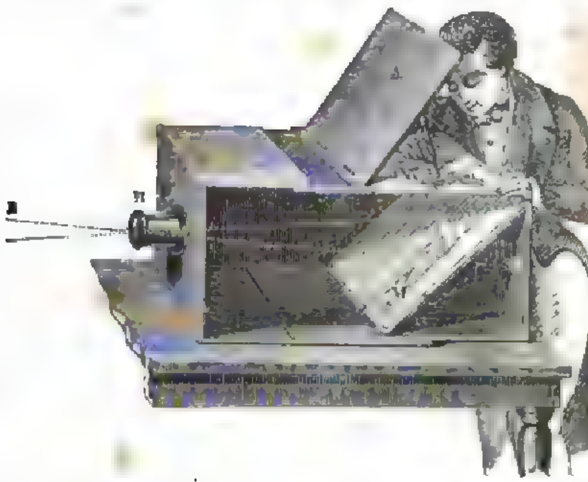
Q. Is a glass or lens necessary to produce this effect?

A. Although images may be received without the lens, they are confused and indistinct. A lens is essential for proper definition; and, in proportion to the power of the lens, is the image clearly defined.

Q. For what purpose was the camera obscura formerly employed?

A. It was used in drawing, especially by landscape and panorama painters, as sketches could thus be obtained with facility and accuracy.

The accompanying figure represents one of these old-fashioned cameras. It consists of an oblong box, into which the rays of light, R, are admitted through the lens, B, and form an object on the opposite side, O; but as the rays encounter a glass mirror, M, they change their direction, and the image is formed on the glass screen, N. Upon this a sheet of paper may be placed, and the outline of the image



readily traced. A is simply a flap or screen to intercept the light, which would otherwise render the image on the glass invisible. The box consists of two parts, sliding in a groove, and is so arranged for the purpose of obtaining a clearly defined image whatever may be the distance of the object.

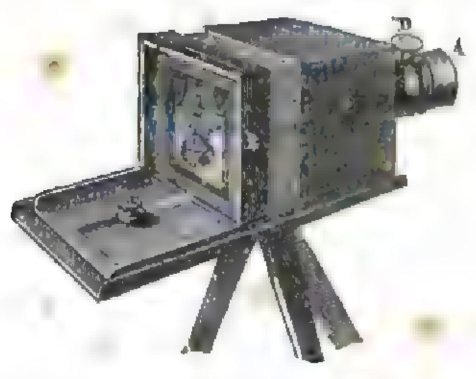
Q. In what way is the camera employed in photography?

A. The image being clearly defined on the ground glass of the camera, that glass is removed, and its place occupied by the prepared paper or plate, which receives and retains precisely the same image as that which was previously seen on the glass.

Q. What is the usual size and cost of a camera?

A. They are of various sizes, according to the dimensions of the picture to be taken by them, and their cost is *from a guinea upwards.**

The annexed engraving shows the ordinary form of the photographic camera. It will be noticed that it consists of a fixed part, C, and a movable part, B. The lens is contained in the brass tubing, A, and is moved backwards or forwards, within the tube, by means of a screw, D. Opposite the lens is a glass screen, fixed in a movable frame, F.



Q. What is the most essential part of a camera?

A. The lens, as on this depends the brilliancy and sharpness of the picture.

(To be continued.)

* Full particulars as to the size and price of photographic apparatus will be found in our advertising columns.

Photographic Notes and Queries.

MEASURING THE INTENSITY OF LIGHT.

London, August 25th, 1858.

Mr. Editor,—I find myself constantly in error, principally, I feel assured, through being unable to hit upon the exact length of time for exposure in the camera of the prepared plate (positive collodion process). I have no doubt but that experience will set me right upon this head; but for convenience of amateurs, &c., could not some instrument be devised for the purpose of indicating the different degrees, or amount, of light existing, and then, by a corresponding scale of seconds, might not the exposure be always correct, and the process conducted with certainty?

I tried last winter to copy small engravings by powerful gaslight (Argand burners), placing the picture very close to the light, &c. I succeeded in getting excellent little pictures, and the time of exposure to this light, using a compound portrait lens and an ordinary ¼-plate camera, was *invariably thirty-five seconds*. Seeing that I could do this with certainty of success—knowing precisely the time for exposure—I imagined that something might be contrived to give one an idea of the amount of light existing at any time, so that he could go about his work with the same certainty of success. We have thermometers for indicating temperature, &c.; instruments for telling us of the humidity, &c., of the atmosphere, why not something to tell how much light (and the quality, perhaps) exists?

I am, sir, yours obediently,

Orientalis.

[The proper time to expose the sensitive surface to the action of the light in the camera has been, and possibly always will be, one of the chief difficulties which the amateur has to contend with; and although some ingenious contrivances have been suggested for the purpose of measuring the chemical activity of the light at any given time, the apparatus required for this purpose would be either far too costly, or the results not sufficiently trustworthy to admit of the beginner deriving much benefit from them. Nothing approaching in simplicity to the other instruments mentioned by our correspondent could be obtained in the present state of our knowledge of actinometry; and even were the best of the suggestions which have from time to time been made carefully and efficiently carried out, we think that more time would be required to obtain sufficient experience to properly understand the result given by the instrument, than would suffice to make our correspondent so experienced a hand at the process he is following as to be able to dispense with any other light-measurer than his own eyes.

Supposing, however, the instrument to be made, and in use, it would afford but very imperfect data to act upon. Each subject to be copied would require a different amount of exposure in the camera, even if the light were not to vary. In portraiture, for instance, a young lady in a light dress would require far less time to sit for her portrait than would a weather-beaten old veteran dressed in black; and in landscape photography, a cluster of trees or picturesque nook in a garden would frequently require fifty times the exposure of a white building under the same circumstances. "Orientalis" must practice a little more, and he will soon find the difficulty of correctly estimating the proper time for exposure to vanish.

In our "Dictionary," under the head of Actinometry, we intend laying before our readers an account of what has hitherto been attempted in this branch of the science.]

BEST FORM OF LENS.—AMBROTYPES.

1st September, 1858.

Sir,—As I have learnt from the newspapers that it is your intention to devote a portion of the "Photographic News" to answering the questions of your subscribers, I venture to ask you to have the kindness, first, to tell me what form of lens is suitable for intermediate-size photographs (10 × 8 to 16 × 14); and, secondly, what is the meaning of *Ambrotype?*

I am, sir, your very obedient servant,

A. M'P.

[1. The most suitable form of lens for photographs of the above size (which are, in our opinion, rather beyond *intermediate*) depends upon whether it is required for landscape purposes, or portraiture. For the former, supposing 12 × 10 be the size, we should recommend a lens of three and a half inches aperture, and eighteen inches focus; for portrait purposes, a lens to cover that field would require to be five inches aperture and twenty-one inches equivalent focus. In the selection of a lens many precautions must be taken, in order to make sure that the one chosen is really the one best fitted for the required purpose. We have a great objection to recommend publicly any one maker in preference to others; but if our correspondent would send his address to the Editor, care of the Publishers, we shall be happy to assist him by any advice which we may be able to give in the selection of a really good lens.

2. *Ambrotype* is the American term for collodion positives on glass. They are not known as such in Europe, and in consequence the photographic public here generally imagine that the term expresses a new kind of picture only known in America.]

PERMANENT BLACK FOR METAL WORK.

London, 4th September, 1858.

Sir,—Your prospectus says, that you intend to teach all the secrets of the photographic art; to solve all scientific enigmas; and to save photographers from the thousand and one dilemmas into which they are every day falling for want of a faithful Mentor, and ever ready and comeatable friend. May you be such a friend!

I am not quite so clever as I hope soon to be, but I, nevertheless, know quite enough not to require to be ashamed of showing a little ignorance, and I beg, therefore, to ask you for a recipe for giving a permanent black to metal diaphragms. I am, sir, yours truly,

W. T.

[A very good *dead* black may be given to metal work by mixing finely-ground lampblack with thin spirit varnish, and then brushing it over the article to be blacked. The quantity of lampblack and strength of varnish can easily be found whilst mixing.

Frequently black cloth, velvet, or unglazed paper, can be used with great advantage as a lining to cameras or lens tubes.]

TENT FOR PHOTOGRAPHIC PURPOSES.

Oxford, 3rd September, 1858.

Sir,—I want a Tent, and don't know where to get a *very* good one very cheap. I was the other day asked five pounds

for one! Will you kindly tell me where I can get a cheaper one? I am, your very obedient servant,

A PHOTOGRAPHIC ARTIST.

[Our correspondent should have mentioned the sized pictures he wished to take in the tent. The price mentioned is not exorbitant for a large and portable tent, with appliances suitable for pictures 10 × 12; but for working plates stereoscopic size a very simple arrangement will suffice. We have taken very excellent stereoscopic pictures in a tent which was home made. It consisted of a black waterproof cover, which was thrown over the camera legs, and having a hole about eight inches square cut out of the side, and filled in with two thicknesses of yellow tammy. The bottles were fastened by means of wooden screws and clamps to the legs, and the bath was likewise screwed to the *inside* of one of the legs. Water was kept in an india-rubber bottle. A little ingenuity will enable our correspondent to make something of this sort himself; but if a larger one be wanted, we must refer him to our advertising columns, as we have not had sufficient experience to be able to recommend any one particular tent.]

CYANOGEN SOAP.—PYROXYLINE PREPARED AT A HIGH TEMPERATURE.

5th September, 1858.

MR. EDITOR,—All hail to the cheap press! I am very glad to know that we are soon to have a cheap hebdomadal photographic newspaper. I hope that it will succeed, and you get rich through it, and we grow wise!

Will you tell me, in the first number of the "PHOTOGRAPHIC NEWS," a recipe for making Cyanogen soap. Secondly—What do writers on the manufacture of soluble pyroxyline mean by the term high temperature?

I subscribe myself, your

WELL-WISHER.

[1. The term "cyanogen soap" is applied to a preparation which is made and sold by a London house for the purpose of removing silver stains from the skin, &c. The mode of making it is kept a secret, but by means of a piece of pumice stone and a lump of cyanide of potassium all the good results attending the use of the cyanogen soap may be effected, at a tenth part of the expense.

2. The term *high temperature* in the manufacture of soluble pyroxyline is applied to a temperature of about 160° Fahrenheit. When prepared with acids of this temperature, the cotton produces liquid collodion, and yields a very glassy and structureless film, adhering tightly to the glass; whilst cotton, which has been prepared in cold acids, produces a thick glutinous collodion, yielding a very contractile film.]

STEREOSCOPIC GHOSTS.

Queen Ann-street, 7th September, 1858.

DEAR MR. EDITOR,—Will you have the kindness to tell me how the ghosts are made to appear half invisible in the stereoscopic pictures that I see in the shop windows.

Yours truly,

ATE J. R.

[The plan adopted by photographers for raising spirits is very simple:—Arrange the subject with the person whose ghostly representative you wish to secure, in the desired place, expose the plate in the camera (a stereoscopic camera with twin lenses should be used) for about half the requisite time; then carefully cover the lenses, remove the "ghost," taking great care not to disturb anything else, either of furniture or drapery, and then uncover the lenses, and expose for the remainder of the time.]

CLEANING GLASS AND PORCELAIN DISHES.—WASHING POSITIVES IN A RUNNING STREAM.

Hants, September 1st, 1858.

SIR,—Having seen your advertisement in the papers to amateur photographers, I wish to avail myself of your offer in asking a question or two.

1. * * * * * * * * * * * * * * *

2. How can glass dishes be cleaned? For if I scrub and scrub till I think they *must* be all right, yet still, in the waxed paper process, the development shows that they are still dirty.

3. As to washing positive proofs—a running stream is the thing. Now I have opportunities to make use of this, but can't tell how to, for this reason:—The water runs from an underground gutter into a large pond, which is on the same level as the mouth of the gutter. Can you understand this, and, if so, help me.

I am, sir, your well-wisher for success,

J. S. H.

[1. We know nothing of the apparatus you name, but will make inquiries, and answer in a future number.

2. You have, we suppose, followed the usual plan in cleaning dishes. After a dish has been made quite clean by chemical means, the final polish is given to it with a comparatively dirty cloth. We say *comparatively;* for what is commonly called a clean cloth might easily sully the purity of a chemically clean porcelain surface. We clean our dishes in the following way, and can confidently recommend it:—Remove the greater part of the dirt by good washing in hot water. Allow a solution of cyanide of potassium (two ounces to the pint) to stand in the dish for an hour or two, then pour it back into the bottle for future use, and give the dish a good scrubbing with a brush, remembering to clean the *corners* well; rinse with water; fill with dilute nitric acid (one part to eight), allow it to stand for ten minutes; rinse several times with common water, and, lastly, with pure distilled water; let it drain for ten minutes, and then dry and polish with *clean filtering paper*, or a *really clean* cambric handkerchief; the former, however, is better. If the dish be wanted in a hurry, pour a little concentrated nitric acid into it; rub it well all about and into the corners with a piece of tow at the end of a stick, then rinse, drain, and dry as before.

3. We can hardly advise on this point without having seen the pond, &c. However, we will try and suggest some feasible plan for the purpose. Of course there is a current of water flowing from the point of influx towards the centre or some other part of the pond. Can you not contrive a wooden box, with holes in the sides, so that when one of these sides was placed near the gutter there would be a continuous current of water through the box? By a little management in the position of the holes in the box which served for the ingress and egress of the water, so as not to have them quite opposite to each other, a rotatory motion would be communicated to the water as it passed through the box, and then positive prints placed therein would be washed famously. If they were in large quantities

there would be danger of their being matted together, and only revolving in a mass. You must guard against that—probably by having several such boxes, and placing a few prints only in each. We should like to know, for the benefit of our readers, what plan you really adopt, and its practical utility.]

ANSWERS TO MINOR QUERIES.

WHITE POSITIVES ON GLASS.—*Aspirant; A Photographic Amateur; Tyro.*—In answer to these correspondents, who desire to know how to obtain positives on glass, having pure whites with intense vigorous blacks, we recommend the following plan, as having been very successfully employed under similar circumstances:—Use a rather thinly iodised collodion, and add to each ounce of it two grains of bromide, and one grain of chloride of cadmium; let the silver bath be rather acid with nitric acid; develop with the following mixture:—

Sulphate of iron	15 grains.
Nitrate of potassa	10 grains.
Glacial acetic acid	20 minims.
Alcohol	30 ,,
Water	1 ounce.

The collodion should have a good share of pyroxyline in it; the plate must also be well drained, and wiped well at the back, and the developing solution should not be poured off and on whilst the image is coming out, but simply moved to and fro. When developed, wash well before fixing, and for this latter purpose use cyanide in preference to hypo.

SUBSTITUTE FOR AN ACHROMATIC LENS.—*An Apprentice* wishes to know what he can get to answer the purpose of an achromatic lens. He has made a small photographic apparatus, and is now deterred, by the high price asked for an achromatic lens, from pursuing his experiments further. At the commencement of our own photographic career we were in a similar predicament. An old cigar box had been, by dint of much labour, converted into a camera; focusing screen and paper holders (collodion was as yet undreamt of) were carefully fitted to it, and a lens was the one thing wanting before we started, full-fledged photographers, in search of the picturesque. This was the first real difficulty we had met with; and, after many anxious moments, it was overcome in the following way:—Sixpence was invested in the purchase of a spectacle glass of about twelve inches focus; this was ascertained by measuring the distance between the glass and the image of a distant stack of chimney pots. Then a cardboard case (of the pill-box kind) about eight inches long and one in diameter, with a sliding lid, was found, and by cutting off the two ends and part of the case, it was transformed into two cylinders, open at each end, and sliding one into the other. The outer one was then *fixed*, by means of glue and gummed paper, on to the end of the camera, opposite the part where the focusing glass went—a hole being first cut in the box the diameter of the tube. The spectacle glass was next fastened, in a similar way, on to the end of the inner sliding tube, and then the *lens* end slid into the outer tube. This gave a pretty good image on the ground glass, but it was only good in the centre, and had a ring, of a nebulous, faint appearance, all round; this we obviated by fastening a piece of card on to the end of the inner tube, away from the lens, and cutting a hole, about a quarter of an inch in diameter, in the middle of it. The image now was much reduced in brilliancy, but the sharpness was exquisite, and the ring of faint light was quite gone. For some time this constituted the only apparatus we had; and, before it was cast aside for a larger and more costly apparatus, we succeeded in obtaining some capital views by its means. The principal defects were, slowness in work, the paper requiring to be exposed about twice the ordinary time; and limited extent of field, the lens spoken of above, instead of covering a field of 7 × 9 inches, would only take a 4 × 5 inch picture.

HOW TO SEE IF A CAMERA IS LIGHT-TIGHT.—*A Freemason* complains of a *dark* spot about the size of a sixpence, with concentric circles gracefully extending outwards, and of lighter shades frequently occurring on his pictures. This is a difficulty which evidently arises from some mechanical defect in the lens tube or camera. First see if the spot always occurs on the same part of the plate; then examine the dark slide, and see whether there is a small hole opposite that part of the plate either in the front or back of the slide: this will be best seen by putting the slide in its proper place in the camera, unscrewing the lens, and then throwing the focusing cloth over your head, look in at the lens end of the camera, and carefully examine the opposite dark slide, first opening the *back* so as to see if the front slide is light-tight, and then closing the back, opening the front slide and examining the back in the same way. This test should be tried in sunshine, or in a strong light, and a little scrutiny will show the slightest cranny or chink capable of admitting light to the plate. If this scrutiny does not show the presence of any aperture, the fault must be in the lens or mounting. Screw the lens into its proper place again, point the camera opposite a well illuminated object—a white building with the sun shining on it will be best—and place in the focusing glass. Now throw the opaque cloth over your head, and carefully examine that part of the ground glass which corresponds to the *spot* on the picture, by looking at it from all points of view. Most likely some irregular reflection from part of the brass mounting will now be perceived, and by keeping the head in the position in which the light is best seen, and then removing the ground glass, some part of the brass-work will be seen reflecting light brilliantly where it ought not, or else light will be seen entering into the camera through some hole in the camera or brass-work. The remedy will be obvious; a piece of black velvet glued inside the lens tube, where the reflection takes place, or a metal or card diaphragm placed near the lens, will easily remedy one source of failure, whilst a plug of cork will be found an effectual stopper to all light through small holes.

TO CORRESPONDENTS.

F. C.—E. H.—K. F.—J. M.—O. P. Q.—An Old Friend.—F. S. C.—A. B.—J. J.—Rev. J. L. S.—T. G.—J. S. B.—H. M.—J. S.—X. Y. Z.—Ada.—W. P.—J. McG.—Rev. W. L.—The Editor wishes to express his most sincere and grateful thanks to the above friends, who have on the first announcement of his intended re-appearance before the photographic public so cordially welcomed him with kind offers of assistance, or suggestions for rendering the pages of the "PHOTOGRAPHIC NEWS" more interesting and instructive.

J. B. incloses a beautiful positive print on paper, and asks us to point out the remedies to the faults we may see in it. We are afraid we cannot quite do as requested, the picture, in our eyes, being nearly faultless. We are inclined to think our correspondent is not quite such a novice in the art as he would make it appear. Acetic acid is the best thing to counteract too much ammonia in the bath. The other fault complained of must be owing to the negative being inferior.

D. H.—Mr. Rollason has a process for transferring positives on glass from the glass to black japanned leather or cloth; but as we believe he only communicates the process by license, and on condition of secrecy, we cannot enlighten our correspondent on this subject. We have seen many specimens taken direct on leather. The leather is fastened to a plate of glass by means of white wax or gutta percha, and then is coated with collodion sensitised, exposed, developed, and washed exactly in the same way as by the ordinary process on glass.

C. L.—Articles on the subject of grinding lenses are in contemplation, and will be given in an early number of the "NEWS."

Received too late for notice in this number.—J. C.—Caustic.—F. S. C.—J. B.—E. B. G.—D. H.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, addressed to the office, should, in all cases, be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 2.—*September* 17, 1858.

THE FUTURE OF PHOTOGRAPHY.

BY M. A. BELLOC.

THERE can be no doubt, that in all future time the photographic art, in its numerous varieties, and under its manifold forms, will rank amongst the grand discoveries which render illustrious the nineteenth century. Railways, which abridge space, and the electric telegraph, which annihilates it, are of those marvellous applications of science which compensate for its protracted meditations and its persevering labours. It is when science shows itself in works, which all of a sudden change and ameliorate the conditions of human existence, that the world realises all the grandeur of the discovery, and compensates for its disdain by unlimited gratitude. The photographic art is one of those fruitful applications which immortalise an epoch, and give to science its highest consecration. Until then, nature was reflected only in the clouds, in the water, and in some transparent substances—a fugitive reflection without utility. But now nature is subservient to our will, and can be reproduced upon substances at our disposal, and that with a permanency, and in such reduced proportions, as to enable us to form a collection, if we may use the term, of all its riches and all its treasures. Is not magic surpassed by such results? We can have inclosed in a frame the picturesque site which transported our imagination—the hamlet where we first saw the light; better still, a revered mother, a cherished wife, the child we idolise, and this not *almost* the same, as when man endeavours to imitate the objects of creation, but identically the same, inasmuch as it is nature herself which reproduces herself by reflection. Everything which is grand and beautiful in the universe and humanity may be religiously preserved. . . . . .

But, it is asked, what becomes of art if nature paints herself? Art, far from being dethroned, will reassume her true position; it will abandon the vulgar ground of imitation for the higher sphere of invention. To imitate is but to translate, and all translation is but an alteration more or less coarse. To aspire to the supremely beautiful is the essence of the real artist. The ideal is for him—reality is the domain of photography. Photographic art, though still in its infancy, has already made gigantic strides towards its full development. Is it after all an art? Is it a science? It participates of both; it is the conciliation, and almost "the fusion" of the two. It is art identified with nature, —it is "applied science." Perspectives, more and more extended, develop themselves in proportion as advances are made in this new domain. Routine has not yet had time to implant itself on this virgin ground. Traditions—inevitable processes—have not yet, as in most other specialities, reduced intelligence to a passive condition. There, each practitioner is an experimentalist. To operate ably, it is necessary to exercise all the sagacity which nature has allotted to you—all the faculties that labour and perseverance have developed in you; and each effort has almost always its immediate recompense. There is, perhaps, scarcely an operation conscientiously made which has not for its object a special light, even if it be but the most trifling detail of the work. At one time it is the object of the work which gives a glimpse of the possibility of acquiring a new perfection. At another time it is the substance employed to obtain this result which indicates, to some extent, the means of multiplying its force or its efficacy: or, still further, it is the instrument proper to prepare, to combine, to transform substances more or less heterogeneous, that use advises to modify in such or such a sense so as to derive from this instrument a more prompt and decisive assistance. In this new world, where, without reckoning on the interference of chance (upon which we must never count), observation suffices to put us on the road to discovery, we never pause, but always advance.

Do not believe that this art, which embraces so many things, which supposes so much general knowledge, tact, and experience, requires on that account exceptional men; this would tend to confine the practice to the exalted spheres of science, always inaccessible to the great majority of minds. The very contrary will be the case. The photographic art will realise the benefit so often and so vainly promised of the vulgarisation of science; it will render it attractive by the charm and facility of its application. In a few years, perhaps, most families will reckon among its members at least one operator. Observe, also, that in all things progress tends to simplify and reduce the instruments and labour to their most simple office . . . . . .

There are persons who fear, in the interest of the ideal, the cheapening of objects of art. A puerile terror! When that which is beautiful is within the reach of all, the artistic sentiment will perfect itself by the very fact of its extension. So long as taste is a privilege, it is almost always a caprice. When it has become a general faculty, though of divers degrees, it will elevate itself to a superior power; and it will have a *plus* value, if we may be allowed the term, in the imagination of the human species.

Photography is not limited to reproducing lines and surfaces. It has found its complement in the stereoscope, which gives to a design the most irresistible appearance of relief and of roundness, insomuch, that nature is no longer content to reproduce herself superficially, she gives, in addition, the complete idea of projections and contours; she is not merely a painter but a sculptor.

. . . . . . It would not be difficult to point out the moral result of this new art. It is not only curiosity that will be gratified by the reproduction of

objects most worthy of interest or admiration; the heart also will not be without its gratification. The portrait is no longer the privilege of the rich. The features of those whom we have cherished, and who have loved us, will give to the past all the charm, all the liveliness of the sensation of the present. They will eternalise for us the memory of all the little happiness we have enjoyed here below. . . . Happy those who may be able to assist in the development of this new art, which has made its *début* with so much power, and which brings us at the same time such vivid enjoyments and such sweet consolations.—*Revue Photographique.*

THE STEREOMONOSCOPE.*

BY M. A. CLAUDET.

No stereoscopic effect can exist but when each eye perceives an image of different perspective, and when the pairs of similar points of the two retinal images have these points less convergent and more distant from each other, according as the objects which they represent are nearer; and more convergent, or less separated from each other on the two retinæ, as the objects are at a greater distance from the spectator.

From the horizontal position of the two similar points of the two images on the retinæ, it results that, to make them coincide successively on the centre of the two retinæ (an indispensable condition of distinct vision and single perception), one must converge the optic axes more, to examine the point nearest the solid, and converge them less and less as the points are more and more distant. In like manner, no pseudoscopic effect can exist, but when, by inverting the perspective images, which reverse on the retina, the relation of the distances of the similar points of the two retinal images, we make them coincide at the centre of the retina. It is necessary to converge the optic axes less for the nearest point, and more and more for points more and more distant. This is because, in every case, the sensation that accompanies each angle of convergence, gives us by habit a true or false judgment of distances. A true judgment when the different degrees of convergence follow the natural order (which is to augment in proportion to the nearness of objects, and to diminish in proportion to their distance), and false when it follows a contrary order.

When the two images are separated, as is the case in the stereoscope, that to the right is brought to the centre of the retina of the right eye, and that to the left, to the centre of the left eye by means of the refraction of the lenses. We can obtain the same effect without the stereoscope, and even in greater perfection, merely by separately directing each optical axis on the centre of the image opposed to it. In this disposition of the optical axes, which is in fact the natural one, when we look at an object more distant than the images, that to the right is painted on the centre of the right retina, and that to the left on the centre of the left retina.

This separation of the images does not exist on the ground glass when they are produced by the two horizontal apertures of the lens, and as on the contrary they are superimposed, it would not be possible separately to converge each optical axis on one single point of the image (the perspective of which belongs to it), if each eye saw at once the two points of the different perspectives of the superimposed images.

It is absolutely necessary that each eye should perceive only one image, and that the two images should be of different perspectives, for it is only on this condition that the play of the convergencies, through which we obtain the perception of the distances, can be exercised. If each eye saw at the same time the two superimposed images, there would result, in the centre of the two retinæ, confusion in the coincidences of the various points of the different perspectives of the solid. Some would produce a stereoscopic, and others a pseudoscopic effect. These effects would destroy each other, and the resultant image would be without relief. This is exactly what takes place, when the image is received on fine paper or on any surface of similar transparency.

Now, as ground glass really gives the illusion of relief, it can only arise from each eye perceiving the image, the perspective of which belongs to it, whilst the other remains invisible, for otherwise the eyes could not each choose, in the union of the two images, that which was proper to each, while it rejected the other.

Foreseeing an objection that will doubtless be raised, and one which, in the mind of certain persons, might have some appearance of plausibility in combating my theory, I must remark once for all, that when I say "the image visible to one eye is invisible to the other," I do not pretend that it is completely invisible, but only that it is so weak that the attention is not arrested by it, and is directed to the clearest and most vigorous image. It is only in a physiological sense that, in the course of this paper, I employ the terms visible and invisible.

The phenomenon of two images superimposed on the ground glass, each visible to one eye, and invisible to the other, is proved by the experiments already mentioned; but there is one that is much more decisive, and which consists in placing a blue glass before one of the two marginal apertures of the lens, and a yellow glass before the other. The effect of these coloured glasses is, that each produces on the ground glass an image of its own particular colour. Two superimposed images are the result: the one image blue, and the other yellow, forming, by coincidence, only one image of a gray tint (the mixture of yellow and blue) when we gaze at it with both eyes. But if we shut alternately the right and left eye, we see a blue image in one case, and a yellow one in the other.

While we look with both eyes (the aperture to the right being covered by the yellow glass, and that to the left by the blue glass), if we move the head horizontally to the right, as soon as we obtain an inclination of six degrees, the mixture of the two colours disappears, and the image becomes blue. If, after returning to the centre, whence we always see the same gray tint (the mixture of the two colours), we move the head to the left, as soon as we attain on this other side an inclination of 6 degrees, the mixture again disappears, and the image is quite yellow.

The same effects occur, if, being placed in the centre, whence we see the mixture of the two colours, we close alternately the right and left eye, in one case the image is blue, and in the other it is yellow.

When the blue and yellow images are received on paper, the mixture of the two colours is preserved perfectly well; if we look with one eye, or if we look with both, or straight before us, or if we incline the head to the right or to the left, we cannot in any manner separate the colours, and behold only one of them.

Attentively considering all that passes in the course of experiments with coloured glass, we observe that the rays refracted by the yellow aperture to the right of the lens, fall obliquely from right to left on the centre of the ground glass, while the rays refracted by the blue aperture to the left of the lens, fall obliquely from left to right. These rays from opposite sources cross each other in the focus of the camera, and, supposing no ground glass to be present, they would continue their course in a straight line, those that emerge from the aperture to the right, taking their course to the left, and those from the left aperture taking their course to the right. Now, as a refracted ray is only visible when it coincides with the optical axis, it is evident that when the ray refracted obliquely by the aperture to the left of the lens falls on the retina of the right eye, it cannot at the same time penetrate into the left eye, and when the ray refracted by the opening to the right of the lens strikes the

* Continued from p. 4.

retina of the left eye, it cannot penetrate into the right eye. Thus, the right eye only perceives the blue image, and the left eye only perceives the yellow image. Consequently each eye sees an image of different perspective, and we receive on the retinæ two images capable of imparting the stereoscopic illusion.

If at the spot where the oblique rays cross, which is the focus of the lens, we place ground glass, the two images produced by the two apertures appear represented on the surface, where they coincide, but, by a singular phenomenon, each of the two images is not visible to both eyes at once. The right eye perceiving only the image to the left, the rays of which strikes obliquely the surface of the ground glass, and without being arrested by this surface, falls on the pupil of the eye. The same thing happens with the other image, of which the left eye only perceives those rays, which, in their oblique course, coincide with the axis of this eye.

But how does it come to pass, that if, instead of ground glass, the images are received on plain paper, or on any other similar surface, each eye sees the two images at once, and that, whether we look with both eyes or with one eye, or with the head to the right or the left, the image always preserves its mixture of the two colours?

In order that these effects should show themselves differently on each of these surfaces, it is necessary that the rays should continue their course in a straight line through the ground glass, from the aperture to the left, into the pupil of the right eye, and from the aperture to the right into the pupil of the left eye, and that they be not arrested on the surface of the ground glass. But if we substituted paper for ground glass, the rays must be arrested in their course on this perfectly opaque surface, where the image then becomes fixed; and each molecule of this surface should, on becoming luminous, emit new rays, diverging in every direction, so that each eye should at once perceive all the images superimposed on the paper in any position we assume, whether in the centre of the camera, or with the greatest possible inclination to the right or to the left.

Such must be the cause of this phenomenon; and, in fact, it is easy to prove, that ground glass and paper have, inherently, entirely different properties; that the former allows a free passage to the direct transmission of the rays which meet its surface; whilst the latter is an obstacle to this direct transmission, and even scatters them at every possible angle.

In fact, if we place before the sun, or before a lamp, a frame, half of which shall contain a sheet of paper, and the other half a square of ground glass, and if we look straight at the two surfaces, we see the paper and the ground glass, although equally lighted from behind, transmit the light unequally; *that* from the ground glass appearing much more intense than *that* from the paper. But if we depart from the perpendicular, and move sideway either to the right or to the left we gradually lose the light from the ground glass until it entirely disappears, while the surface of the paper preserves the same intensity of light, in what position soever we look at it.

(To be continued.)

THE STEREOSCOPIC ANGLE.

OUR able contemporary, the *Literary Gazette*, contains the following very able and lucid remarks upon the "Stereoscopic Angle," refuting some of the scientific reasonings of Mr. Lake Price, as set forth in his manual of "Photographic Manipulation:"—

"In his directions for taking stereoscopic pictures, Mr. Price, writing in accordance with the common, but as we believe very erroneous notion, says, with reference to the placing of the lenses, that, 'at ten feet from the subject three inches apart would be ample to give a natural, and, at the same time, striking relief,' but beyond that the cameras must be set farther apart in proportion as the distance of the principal object increases. 'The fact is,' he goes on, 'that, according to the class of objects to be treated, the mode of representing them must be varied; for if such an angle as three inches were applied to a view in nature, the extreme distance being mountains, some ten miles or more from the cameras, the picture would be *flat*, owing to the insufficient angle given. For such subjects *fifty feet apart is not too much*, provided always that the *foreground objects* are not *near* the lenses, as then they would of course suffer much distortion.'

"Now, this is not only erroneous in itself, but inconsistent with what the author lays down elsewhere, with all the emphasis of italics, as 'that which must be the object of our imitation—*nature as seen by the human eye*.' Nature as seen by the human eye can only be represented in the stereoscope by stereographs taken with lenses little, if at all, wider than the eyes apart. For near objects Mr. Price admits that although a greater appearance of relief can be gained by increasing the distance of the cameras from each other an inch or two, that additional relief is in fact a distortion, that is, untrue representation. Yet for distant mountains he would increase the distance to fifty feet merely in order to get rid of the flatness in the appearance of the mountains, for the intermediate objects he acknowledges requires no such separation of the lenses to obtain adequate relief. Now, we have studied among the mountains as well as Mr. Price, and we venture to affirm that the stereoscopic picture of a mountain ten miles off, taken by cameras fifty feet apart, would be as utterly, though not as palpably, untrue, as the picture of any ordinary object ten feet off would be if taken by lenses a foot apart; while the appearance of all objects in the middle distance would be rendered utterly wrong. In truth, in looking at very distant mountains in nature the eye sees little relief or solidity. The mind has the sensation of solidity, because experience and knowledge tell it that the mountain is really a vast mass with its mile after mile of green sward and purple heather, its long stretches of boggy peat and moss, its woody crags and gloomy clefts, and bare precipices, and leaping streamlets, and shattered peaks. But when the stereoscope presents us, by means of a couple of stereographs taken from widely separated stations, with a picture of the far-off mountain, and all the intermediate scenery, as it never could by any possibility be seen by human vision—for the most determined stickler for taking stereographs after this fashion will admit that the human eyes could never be projected fifty feet apart—we get indeed an increased appearance of relief, but the mountain is degraded in size and impressiveness, and the whole has very much the character of an ingenious model. Hence it is that stereoscopic views of mountain scenery which have been taken upon this system are generally felt to be unsatisfactory—almost toy-like—in character, though the unreflective observer may not discover why. The uneducated eye is delighted to see in the stereoscope objects stand out with a measure of rotundity and relief so much greater than it ever saw in nature, and the vulgar stereoscopist takes care alike in his scenes from nature, and in his coarse groups of semi-nude females, to pander to the popular taste. But the true artist will neither degrade his art by choice of unwholesome subjects, nor by intentional untruth. If the reader is inclined to say that we have dwelt too long on a comparatively unimportant point, let him ask himself whether he does not value the stereoscope because he has been accustomed to consider that it presents him with views of unimpeachable fidelity as well as singular reality; and if so, whether it is not desirable that a system which must of necessity render its views untrue, and therefore comparatively untrustworthy, should be opposed at all times, but especially when set forth in a manual which will undoubtedly take rank as a leading authority with the photographer. But it is becoming more than ever essential that the stereoscopist should be impressed with the importance of aiming at the most exact truth, at the risk though it be of some little loss of effect, for the stereoscope is becoming a great instructor. By it, Egypt and Palestine have been

brought home to us; Teneriffe has been put on the study-table; the glaciers of Switzerland may be examined at our leisure; and soon regions as yet untraversed will be rendered familiar; and what if, after all, from the stereoscopists proceeding on a wrong system, we have views perfectly free from 'flatness,' but at the same time perfectly unlike what the human eye would see? It is indeed of primary importance that stereoscopists should feel that what they have to aim at, especially in unfamiliar scenes and regions, is to produce stereographs strictly, and, so to speak, scientifically accurate —views upon which the observer might reason with as much certainty as though the scene itself were before him. We should, in truth, like to see on every 'slide' marked not only the date and the hour when the view was taken, but the distance of the lenses apart."

New Discoveries.

PAPER-GLASS AND INDELIBLE POSITIVES. *By M. Gaumé.*

M. Gaumé, an experienced artist of Mans, has presented to the French Photographic Society, in competition for the prize offered by the Duke de Luynes, a memoir on a new method of printing and fixing positives, which consists chiefly in the preparation of what he designates *paper-glass*, upon which the positives are as unalterable as upon albumenised glass. We are enabled, through the kindness of M. Gaumé, to give, in this number, a complete account of his invaluable discovery. The theory upon which he proceeds is this:—

"If we examine carefully a faded positive proof, it will soon be perceived that the picture still exists, but that it is obscured by a subjacent substance, not formed by the hyposulphite of soda,* as has hitherto been imagined, but by a compound of silver, which has penetrated the paper, and has not been converted into chloride. It is therefore necessary to find a means of preventing the nitrate of silver from penetrating into the substance of the paper, or, in other words, to form what may be called paper-glass.

"In 1853, having employed basins of cardboard, coated with gutta percha dissolved in benzol, and finding that these vessels would hold the solutions for a long time without getting out of shape, I thought afterwards that if I were to decolorise the gutta percha, and then to impregnate the paper with it, I might afterwards coat it with albumen, and then proceed to take a positive on it in the ordinary way.

"To prepare the gutta percha solution, place forty or fifty parts of gutta percha and a hundred parts of pure benzol in a glass flask, and dissolve by means of a water bath. Allow the coloured part to settle, and when the liquid has become of a light amber colour and perfectly transparent, decant the clear part, and add benzol if experience shows that it is too strong; for it is necessary that the paper, after passing through this mixture, should remain almost as opaque as before, in order that the photographic image may be good, and not look like a waxed proof.

"The paper is prepared in the following manner:—Take a glazed porcelain dish, fill it with the above solution, and cover it with a glass which is a little smaller, so that it rests only on two opposite sides of the dish (a vertical bath such as is used for the silver bath, in the collodion process, would be better), in such a manner, that by passing a sheet of paper between the edges of the dish and glass on one side, and pushing it with the left hand, it will emerge, curling up at the other side of the dish between the opposite two edges, and may be taken by the right hand and removed from the liquid without any stoppage. Now hang it up by one corner; and when it has changed from being transparent (which it is on coming out of the liquid) to being almost as opaque as it was before immersion, hold it before a brisk fire to melt the gutta percha which the benzol leaves in the form of little white granules. The sheet then becomes a little more transparent, and as firm as parchment, and is quite impervious to those substances which go to form a photographic proof.

"I next coat it with chlorised albumen, as is usual with other paper, either by forming the sheet into a little tray in which the albumen is poured, or by laying it on the surface of the albumen, as is customary with most operators. It matters little how it is done.

"I excite, as usual, in a fifty or sixty grain solution of nitrate of silver, and when quite dry, I proceed to print from a negative on it in the ordinary manner, and fix in hyposulphite of soda; the stay in this bath need only be very short. It would only require the time of a negative on glass; but as I put the chloride of gold in this bath, it must remain until it is of the desired colour. I wash in a large quantity of water for a quarter of an hour, or even less; it may, however, be washed longer if thought necessary. Dry in blotting paper first, and then before a fire, and the picture, of an admirable transparency, appears to me to be indestructible.

"This process, which seems long at first, is really very short, since the last operation takes hardly any time, and the first not more than a minute for each sheet.

"The price is also less, since, owing to the paper being unabsorbent, the bath of nitrate of silver does not weaken so rapidly."—*Cosmos.*

* Only in some cases in others the hyposulphite exerts the principal fading action.—Ed.

PERMANENT PRINTS IN SULPHUR. *By MM. Henri Garnier and Alphonse Salmon.*

The chemical reaction which takes place between sulphur which has been exposed to the light and mercury is the basis of the present discovery.

A piece of roll sulphur is dissolved in bisulphide of carbon in the proportion of one of sulphur to three of the bisulphide, and then filtered. Pour on to a sheet of paper a sufficient quantity of this solution, and move the paper about briskly in all directions, not only that the liquid may spread uniformly, but to prevent the formation of crystals of opaque sulphur, which are not sensitive to light, then preserve the sheet of prepared paper in darkness. At the proper time place the sheet under an ordinary negative, and expose it to the light twenty-five seconds to one minute in the sun, two minutes on a clear day, or five minutes on a cloudy day.

Nothing will be seen when it is removed from the pressure frame. Place a little mercury in an iron vessel, and heat it by means of a spirit-lamp. Three

or four inches above this stretch a sheet of good smooth paper, and lay on this the sheet which has been exposed to the light, the sensitive side below facing the cover of the vessel which contains the mercury. The mercury volatilises, and its vapour filtering, as it were, through the underneath sheet of paper, acts upon the sulphur which has been acted upon by the light, and produces a dark sulphide of mercury, which brings out in a very perfect manner all the details and half tones of the picture. Protect this black sulphide of mercury by a coating of varnish, gum, or albumen, and the operation is terminated. In order to better protect the image from the direct action of the mercury vapour, it will be as well also to place the exposed paper between two sheets of ordinary paper; the action of the mercury is thus rather slower, but more certain.

The sulphide of mercury which forms this image is unalterable by alcohol, ammonia, ordinary sulphuric, nitric, or hydrochloric acids, cyanides, organic acids, alkaline sulphides, &c. &c. Aqua regia, strong nitric acid, and acid nitrate of mercury are its only solvents; heat only affects it at an elevated temperature.

Mr. Salmon concludes by remarking that in this new process the chemical reaction is remarkably simple; in the old process on the contrary, there is a very complicated and intricate chemical reaction: and in order to bring out the image in perfection it is necessary to introduce agents which cannot be entirely removed from the paper, and which ultimately destroy the picture in spite of all that people say or do on this subject.

In order to judge properly of the value of these processes, and of the chance which the authors have of obtaining the prize offered by the Duke de Luynes, it will be necessary to wait until the ingenious and skilful authors have produced pictures which they consider perfect specimens of the capabilities of the process. The pictures which are at present to be seen are very interesting and full of promise, but they do not as yet come up to our *beau-ideal* of the desired process.—*Cosmos.*

Critical Notices.

REVIEWS OF BOOKS.

What to do in Photography, and how to do it. By G. WHARTON SIMPSON. London: Henry Squire and Co., King William-street.

THIS is essentially a practical book, of which the style is very simple and perspicuous. Unlike the writers of many elementary books on Photography, the author has not presupposed any previous knowledge of the subject in his readers, but has begun at the beginning, explaining everything that can need explaining, and has carried the tyro through each stage of the collodion process on glass, and printing on paper. The result is a work instructive to the novice, and a comprehensive text-book for the practical photographer.

An especial feature of the book is the introduction of a new process under the name of Alabastrine Photography, some specimens of which have been brought under our notice. As glass positives we have seldom seen anything to equal them, whether in their character as photographs, possessing whites of great purity, and rich blacks, or their susceptibility of receiving high finish in colouring by the ordinary dry colours. The process appears very simple, the usual material of glass positives being employed up to a certain point, after which the application of a redeveloping agent, and a suitable varnish, completes the process. The results we have seen are well worth the attention of photographers.

Hints on Fothergill's Process. By W. ACKLAND. London: Horne and Thornthwaite, Newgate-street.

WE have received a small pamphlet under the above title, the perusal of which has given us much pleasure. It is a simply-written account of a process which promises to be one of the best dry collodion processes known. Each operation is taken in detail, and is treated neither diffusely nor too scantily, but in a manner equally intelligible to the beginner and the practised operator. Every line bears the impress of being carefully written by one who evidently is thoroughly acquainted with the process. It is not likely that the reader will be confused with a superfluity of useless technicalities; on the contrary, he may gather many valuable hints. It is, we see, published gratis, and we presume it is obtainable on application at Messrs. Horne and Thornthwaite, 121, Newgate-street.

Since writing the above we have received the following important addition to the "Hints." For the benefit of those of our readers who already possess the first edition, we quote it in full:—

"Having found that uniformity of development depends much on a *uniform* film of *pure* nitrate of silver solution being left on the plate after washing in the well bath, fig. 3, the following expedient has been adopted to gain this desirable end:—

"On removing the collodionised plate from the bath, fig. 2, it is *well washed* (back and front) in a basin of clean water, or under a tap, until all the greasy appearance presented by the film, on being wetted with water, is removed. It is then placed collodion side upwards in the well bath, fig. 3, into which (for a stereoscopic size plate) a solution, made by dissolving twelve grains of fused nitrate of silver in six ounces of distilled or filtered rain-water, has been introduced. The plate is allowed to remain undisturbed for about a minute, whilst a second plate is coated and placed in the bath solution. The well bath is now agitated with some violence for about thirty seconds, so that the solution may thoroughly mix with the moisture on the film.

"The plate is then removed by the aid of a silver wire hook, drained for about ten seconds, with one corner resting on clean filtering paper, and is then ready to receive the coating of albumen as described at page 4.

"The solution in the well bath will serve for preparing one dozen plates, and must then be thrown away, and a fresh quantity mixed for a further number of plates.

"It will be noticed that by adopting this plan the free nitrate of silver left on the plate for decomposition by the albumen is *perfectly pure*, and devoid of any contamination or change that so frequently occurs in the nitrate bath.

"*September 15th*, 1858."

LEEDS PHOTOGRAPHIC SOCIETY.—PROPOSED EXHIBITION.

THE town of Leeds has lately been all astir with the excitement which usually attends the ceremonial of a royal visit. On the occasion of the opening of the Town Hall her Majesty graced the occasion, and the reception which she received was such as to throw all other demonstrations of loyalty in the shade. After the royal visit came the Musical Festival, and now the Leeds Photographic Society have decided upon

holding an exhibition there, in connection with the British Association for the Advancement of Science. This is a commendable step on the part of the Photographic Society of Leeds, and it shows that photography can receive no harm from being in the hands of men who are so ready to turn every opportunity of advancing the cause to good account. The exhibition opens some time this month, and we shall be glad to hear that the scheme has met with that support which it deserves.

Photographic Chemistry.

CHEMICAL NOMENCLATURE.

If every compound of simple bodies had a special name given to it, without any regard to rule, there would be no end to the confusion that would ensue. Chemists have therefore decided upon a method of naming compounds, which is both simple and expressive; this is termed the *chemical nomenclature.*

Simple bodies combine in the proportions of 1 to 2, 3, 4, &c., to form compounds, which, in the case of acids, are thus designated:—If the body forms but one acid with oxygen, the termination *ic* is added to the name of the simple body; thus a union of carbon with oxygen gives carbon*ic* acid. If the body forms more than one acid, that more oxygenated takes *ic*, the less *ous*, as in the case of the combinations of sulphur with oxygen, forming sulphuric acid and sulphurous acid.

An acid more oxygenated than that ending in *ic* is indicated by prefixing *per* or *hyper* to the name of the element. Take chloric acid for example: a larger quantity of oxygen would form *per*chloric acid; and still more, *hyper*chloric acid. On the contrary, if the acid contains less oxygen than that ending in *ic*, and more than that ending in *ous*, it is indicated by the prefix *hypo*; thus, *hypo*chloric acid is more oxygenated than chlor*ous* acid, and this again more than *hypo*chlor*ous* acid.

Those acids containing hydrogen take the same termination *ic;* but its presence is indicated by prefixing the abbreviation *hydro* to the name of the body. Thus we say,—hydrochloric acid, &c. &c.

Oxides are formed by the union of oxygen in certain proportions with an element, mostly a metal, as oxide of silver, copper, &c. If the element combines with several equivalents of oxygen, the least oxygenated combination is termed *prot*oxide; the next, *bin*oxide; and one containing still more oxygen, may be termed *per*oxide. When binary compounds contain neither oxygen nor hydrogen, or if they contain the latter, have not the character of an acid, they are denominated by a union of the names of the two compounds, the name of the first-mentioned body ending in *ide*, and the second remaining unaltered; as brom*ide* of potassium, iod*ide* of silver, &c.

Again, when two elements have several compounds in *ide*, these are expressed by the prepositions *proto*, *bi*, *ter*, or *per*.

The preposition *sesqui* is employed to indicate the combinations of two equivalents of one body with three of another, as the *sesqui* oxide and *sesqui* chloride of iron, containing respectively two equivalents of iron for three of oxygen or chlorine.

We have now to examine the case of bodies formed by the combinations of an acid with a base (salts). Nothing is more easy than the rule which governs their nomenclature. The name of the acid is joined to the name of the base, only the acid in *ic* takes the termination *ate;* the acid in *ous* the termination *ite.* If we suppose the acids of sulphur combined with soda, we shall have with sulphuric acid, sulph*ate* of soda; with sulphur*ous* acid, sulph*ite* of soda. If a simple body gives rise to several oxides, the salts formed with these bases are termed as follows:—sulphate of *pro*toxide, sulphate of *per*oxide, &c.

Bases and acids combined with water are called hydrates, as hydrate of potash, hydrated sulphuric acid. The particles *mono*, *bi*, *ter*, indicating the degree of hydration.

(To be continued.)

Dictionary of Photography.

Absorption of Light (*continued*).—M. Niepce de St. Victor has recently made the important discovery that a body which has been exposed to the effects of strong sunshine (or which has been *insolated*) retains in darkness the effect of this exposure, and is capable of producing in some respects the same effects as a luminous body, by virtue of the light which it has absorbed during insolation. For instance, we will suppose that an engraving which has been kept for some days in darkness is exposed to the full rays of the sun for about a quarter of an hour, one half being covered with an opaque screen. At the end of that time it is removed to the dark room, and kept for twenty-four hours in close contact with a sheet of sensitive photographic paper. On examination, it is found, that the white portions of the engraving which had not been protected by the screen during its exposure to the sun, have been reproduced in black. If the engraving be kept for some days in darkness and then applied to the sensitive paper, without having previously been exposed to the sun, no result is produced. The insolated engraving need not even be in contact with the sensitive paper; it will be reproduced at the distance even of a quarter of an inch off if the design be bold, consequently it is not the result of contact or chemical action.

If, after having exposed an engraving to strong sunshine for an hour, it is placed for twenty-four hours in contact with a piece of cardboard which has been kept in total darkness for some days previously, the absorbed light will be communicated from the engraving to the cardboard; and if this cardboard be now placed for twenty-four hours in contact with a sheet of sensitive paper, the result will be a reproduction of the original engraving. The paper may be impregnated with some substance which is more absorbent of the solar radiation, and then the above experiments can be performed with a much less exposure to light. A solution of either nitrate of uranium or tartaric acid will answer this purpose. If a design be traced upon cardboard with one of these solutions, and, after insolation, applied to a sheet of sensitive paper, the image of the design will be imprinted in a

much more vigorous manner than in the former experiments.

The following is perhaps the most curious and important experiment of all. A sheet of cardboard is very strongly impregnated two or three consecutive times with a solution of tartaric acid or nitrate of uranium, and then exposed to sunlight. After insolation, the interior of a tin tube is lined with the cardboard, and then hermetically sealed. The tube will now preserve, for an indefinite period, the remarkable power of evolving, when opened, the chemical light which it contains stored up in it. At any future time when it is desired to continue the experiment, the tube may be opened; and after injecting a few drops of water into it so as slightly to moisten the paper, reclosed, and exposed to a temperature of about 120° Fahrenheit. On now applying the open end to a sheet of sensitive paper, there will be produced a circular image of the opening as vigorously as if the sensitive paper had been exposed to the sun. Moreover, if an engraving on thin paper be interposed between the tube and sensitive paper it will itself be copied.

The experiment succeeds but once; that is to say, the light seems to have entirely escaped from the cardboard, and to obtain a second image it is necessary to have recourse to a fresh insolation.

(To be continued.)

A Catechism of Photography.

THE CAMERA OBSCURA—(*continued*).

Q. What is meant by a lens?

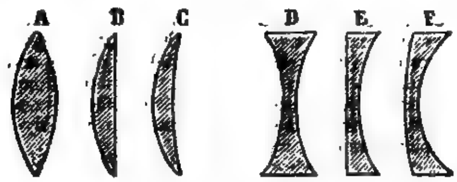
A. The term lens is given to a glass which has the property of converging or diverging the rays of light which pass through it.

Q. Of what material are lenses formed?

A. They are generally made of crown glass or flint glass; chiefly the latter.

Q. Are all lenses of the same description?

A. No; there are several varieties, distinguished from one another by their curvature of surface. Those which are thicker in the centre than at the ends are called *convergents;* those which are thicker at the ends than in the centre are called *divergents.*



In the above figure six species of lenses are represented. The first, A, is called *bi-convex;* B, *plano-convex;* C, *concavo-convex* convergent; D, *bi-concave;* E, *plano-concave;* F, *concavo-convex divergent.*

Q. What lenses are used in the photographic camera?

A. In the earlier experiments a single bi-convex achromatic was employed; but a combination of two achromatic lenses has since been adopted and is found to operate more perfectly.

Q. What is the meaning of achromatic?

A. The term is derived from the Greek, and signifies *void of colour.*

Q. Why are the lenses so called?

A. Ordinary lenses labour under the defect of giving images whose outline is variegated in colour, the achromatic lens is so constructed as to be free from this defect.

Q. Who was the first to construct an achromatic lens?

A. Achromatic lenses were constructed as early as 1733 by Mr. Hall, but his discovery was not published. In 1757 Mr. Dolland showed that by placing two lenses in juxtaposition, one bi-convex, the other concavo-convex, an achromatic lens might be produced.

Q. How are achromatic lenses now produced?

A. By the union of the two lenses, a concavo-convex divergent in flint glass (A) and a bi-convex in crown glass (B) as indicated in the engraving.

Q. How are the lenses adjusted to the camera?

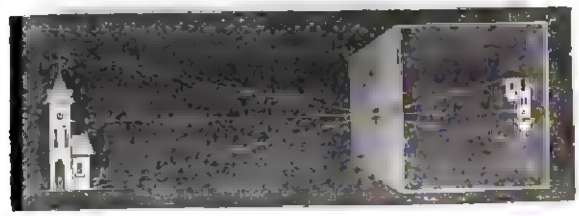
A. They are contained in a brass tubing, and adjusting backwards or forwards by means of a rack and a tooth (*see fig.*) until the correct focus is obtained.

Q. What do you mean by the focus?

A. The focus is the point in which the rays of light from any object meet; practically, an object is said to be in focus when a sharply defined image, complete in every part, is thrown on the glass screen.

Q. Are not the images thrown on the screen inverted?

A. Yes; the inversion of the image arises from the fact that the luminous rays cross each other in passing through the lens, therefore the highest point of the object falls upon



the screen at the lowest point, and the image is inverted, or upside down.

Q. Does not the same phenomenon occur in the human eye?

A. Images formed on the retina of the eye are all reversed, precisely in the same way as they are seen on the ground glass of the camera.

Q. How is it, under these circumstances, that we do not see objects reversed?

A. Various theories have been put forth to explain the phenomenon, but none of these are altogether satisfactory.

The accompanying diagram may be studied with advantage. The rays of light from an object marked A, O, B, pass through the crystalline lens of the eye, and form an image on the retina *b, o, a.*

III.—LIGHT.

Q. What is light?

A. Light is the agent which produces on the retina of the eye the sensation of vision.

Q. What theories are held respecting the origin of light?

A. Two theories have been entertained with regard to this subject, namely, the emissive, and the undulatory.

Q. How do these theories differ from each other?

A. The emissive theory is, that luminous bodies emit in all directions an imponderable substance, propagated in

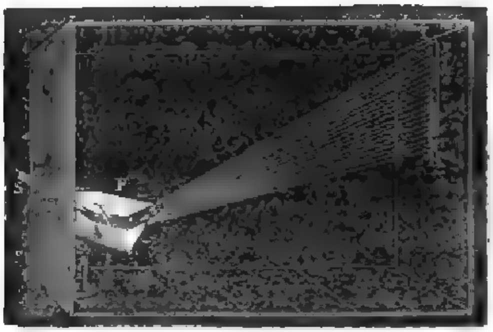
straight lines, and travelling with immense velocity. The undulatory theory is, that the particles of luminous bodies are animated by a vibrating motion, communicated to a subtile and elastic fluid diffused throughout the universe, and called *ether*.

Q. Is a ray of white light simple or compound?

A. Every ray of white light is composed of other rays of coloured light.

Q. How is this fact ascertained?

A. If a ray of white light is passed through a prism, it is immediately decomposed. This may be shown by admitting a ray of white light through an aperture in a window shutter into a darkened chamber, and causing it to fall on a prism A P, as represented in the annexed diagram. The ray of light (S), thus entering, forms on a screen (J) an oblong image, called the *solar spectrum*, and divided horizontally into seven coloured spaces or bands, succeeding each other in the order represented:—red, orange, yellow, green, blue, indigo, violet.



Q. Are these colours of equal brilliancy?

A. No; the red at the lower extremity is very faint, but increases in brightness as it approaches the orange; the brilliancy of the light still increasing, is brightest in the middle of the yellow, from which point it gradually declines, passing through the other tints in succession.

Q. Are these seven colours simple or compound?

A. They are simple colours, and thus, after passing through a second prism, the red, yellow, blue, and other rays remain identically the same.

Q. What are the properties of the solar spectrum?

A. In the rays of the solar spectrum three properties are distinguished, the illuminating, the calorific, and the chemical.

(*To be continued.*)

Correspondence.

TO REMOVE SILVER STAINS.

Newcastle-upon-Tyne, *September* 11*th*, 1858.

Sir,—I think it will be "news," and perhaps *good news*, to some of your readers, to be informed that silver stains on the hands may be very quickly discharged, by means of a solution of cyanide of potassium and iodine: 10 grains of iodine, ½ ounce cyanide of potassium, and 1 ounce water form a very efficient mixture, incomparably more energetic in its action than the simple cyanide solution. It acts so rapidly, that there is not time for the skin to imbibe the poison in hurtful quantities, even supposing, of course, that immediately the stains disappear, or even before they quite disappear, the hands are carefully washed in several changes of water.

But some do not like cyanide, because it is dangerous; they may clean their hands by washing them in a creamy mixture of water and powdered chloride of lime. This method has the disadvantage of being less rapid than the former, and of giving an unpleasant odour to the hands. I have sometimes used hyposulphite of soda after the chloride, this, in some degree, subdues the smell. I think it a good plan to wash the hands with water *before* applying the cyanide mixture, and any very intense stains should be washed with a piece of wet sandstone, or pumice.

I trust these suggestions may contribute toward cleanliness in the practice of photography.

I am, sir, your obedient servant,

J. W. S.

W. Crookes, Esq.

PRINTING IN CARBON.

Sir,—I observe that in your notice of new discoveries, you attribute to *MM. Henri Garnier* and *Alphonse Salmon* a process which it appears to me sufficiently ridiculous to dub "Printing in Carbon," but which you assert does not differ in principle from those of *Mr. Pouncy* and *M. Testard de Beauregard*; of the principle of the latter gentleman I know nothing. My process is my own secret, and, I can assure you, bears not the slightest resemblance to that you are supposed to describe. I am prepared, however, to show you "perfect pictures" produced by my process, which will bear comparison with silver prints from the same negative. Can more be desired at present?

I am, sir, yours respectfully,

John Pouncy.

Dorchester, *September* 13*th*, 1858.

[The article in question was translated from our French contemporary *Cosmos*, and the opinions there given are those of the editor of that paper. We do not know the details of Mr. Pouncy's process, neither have we seen any recent specimens, and should be very pleased to see some of the positives Mr. Pouncy alludes to, both carbon and silver; and if they really are as good as he states, we shall not be backward in giving him the credit of one of the greatest discoveries photography has ever known.—Ed.]

Miscellaneous.

Prizes for Subjects relating to Photography.—The Industrial Society of Mulhouse has proposed, amongst many others, the following subject for a prize:—"To bring into commerce at least five hundred kilogrammes (about half a ton) of paper, having all the necessary qualities for photographic purposes." The prize will be a gold medal of the value of one thousand or of five hundred franks (£40 or £20), or a silver medal, according to the importance of the subject. Everything must be delivered before February 15th, 1859. The Society will send a programme containing full particulars to any one who wishes for them.

A Photographic Accident.—As M. Courtais, a photographer of Bordeaux, was a few evenings ago engaged in his laboratory, a bottle of sulphuric ether suddenly burst, and igniting at a candle set fire to his clothes. In a short time he was enveloped in flames, and rushed down stairs, where some persons extinguished the fire. He was, however, so horribly burned that he expired the next day.

Among the tourists who have been exploring Brittany this summer, we hear of one party, the members of which were lately doing so "with a purpose,"—namely, the production of a book illustrated by photographic drawings. The party in question consists of the Rev. J. M. Jephson, Mr. Lovell Reeve, and a photographic staff. This party, as we are informed, landed at St. Malo, and after encircling, as it were, the ancient province, began their way homeward through the centre of Brittany. They will bring home with them above a hundred first-class stereoscopic pictures, including cathedrals, calvaries, crosses, castles, antiquities, landscapes, fountains, old houses, streets, costumes, and some of the great Druidical monuments still to be seen along the coast of the Bay of Morbihan. Such a party must have encountered droll incidents by the way, and when they entered a town with tent and apparatus, were probably often mistaken for acrobats or Thespian strollers.—*Athenæum.*

Photographic Notes and Queries.

WILL GUTTA PERCHA BATHS INJURE NITRATE OF SILVER.—SUNNING THE NITRATE BATH.—PREPARATION OF OXIDE OF SILVER.—RECOVERY OF SILVER FROM OLD BATHS.—QUERIES ON FOTHERGILL'S PROCESS.—TESTING THE PURITY OF HYPO.

Darlington, 6th September, 1858.

DEAR SIR,—I am induced, from your inviting announcement, to ask a few questions on subjects of general interest to amateur photographers.

Are gutta percha baths injurious to nitrate of silver solution? Is it absolutely necessary that a nitrate bath should be kept entirely from the light, as advised by some, while others actually recommend exposing it to sunshine to correct it when out of order? How would you prepare oxide of silver (in an easy way for an amateur who is no chemist) as recommended by Mr. Thomas, for adding to a freshly-made bath to bring it to a normal state? Do you add the most precipitate or the solution? Will it keep any time, or must it be made fresh as required? In recovering silver from old baths by carbonate of soda, must the precipitated carbonate of silver be kept from the light during washing? Will the iodide of silver, supposed to be present, require any special treatment?

Undoubtedly there is nothing the photographer uses which requires more proper management than his nitrate bath, and amateurs are often much harassed by conflicting instructions. A few hints from an authority like yourself are much needed to settle the points.

I am amazed at the great sensibility of plates prepared by the "Fothergill" process. One drawback seems to be its liability to solarize. Can you suggest a remedy? Here again Mr. Keene, its excellent populariser, advises a plate (stereoscopic size) to be washed with *four drachms* of water. Mr. Ackland's modifications, published on the 1st instant, recommends *eight ounces*. Now, it is evident to any one who knows nothing of chemistry, that there must be an immense difference between one plate and the other; if four drachms is sufficient to prevent stains, &c., eight ounces must reduce the quantity of silver on the surface very much—hence less sensitiveness. Is there any means of testing hyposulphite of soda? I have, unfortunately, a quantity by me very inferior. I made a toning bath (Hardwich's formula), and, on adding the gold, no milkiness took place. I added a second quantity (soda), but it still refused to turn; and, on standing a few days, the gold was precipitated to the bottom. Can it be made available?

CAUSTIC.

[1. There are conflicting opinions amongst eminent photographers as to the injuriousness of gutta percha baths. Some complain, that if the solution of nitrate of silver be kept in them for many days, they cause fogging of the pictures; others, on the contrary, give instances of their negative bath having been kept in gutta percha for weeks and months without any injurious effect. Our opinion is that gutta percha differs in quality, some samples producing fogging after a very few days' contact with nitrate of silver, whilst, in others, negative baths have remained for months without injury. We have no means of discovering beforehand whether a gutta percha bath will injure the solution. Mr. Sang states, that Dr. Young having long observed the injurious nature of gutta percha, renders it innocuous by coating it thickly with shell lac. The lac is dissolved in spirits of wine, at the rate of about 120 to 180 grains of lac to the ounce of spirit (much thicker than ordinary varnish). The vessels are to be well cleaned and dried, and the solution then poured in and out again. A sufficiently thick, and beautifully enamelled coat is thus left spread over the interior of the vessel, which is dried in a moderately warm place, free from dust. Mr. Wellwood states, that the injurious effect of gutta percha vessels arises from there being a film of oil imparted to the outside during the process of manufacture. This may be got rid of by filling the vessels with a strong solution of caustic potassa, and afterwards rinsing them out with nitric acid, and well washing.

2. *Sunning* the nitrate bath will correct it very well in *some* cases, but not in others. A bath that is in good order will frequently be entirely spoiled by exposure to the direct rays of the sun. Very little is known on the subject; and some experiments of our own, made with a view to find out under what circumstances sunning would cure a sick bath, have hitherto given very contradictory results.

3. Oxide of silver may be prepared by adding an aqueous solution of caustic potassa to nitrate of silver solution, until a brown precipitate is no longer thrown down; this is oxide of silver, and it must be thrown on a filter, and washed until the water which runs from it has only the faintest alkaline reaction. Oxide of silver may be also prepared by boiling chloride of silver with potassa solution; but many precautions are necessary to insure a complete decomposition, and the process is not so easy as the above for one who is no chemist. The oxide may be kept for any length of time in the dark, in a well-stoppered bottle; and, for correcting the acidity of a bath or other reactions, will be found more convenient if kept in the moist state. The precipitate itself should be used, as the solution would be far too weak for practical purposes.

4. Yes; the carbonate of silver will otherwise be decomposed. You may safely neglect taking any special notice of the iodide present, it will have no injurious effect on the result.

5. Try a grain of bromide of cadmium in addition to the iodide in the collodion to prevent solarisation. A plate washed with four drachms of water will be more sensitive, but will not keep so long as if more water were used. We should be rather inclined to err on the safe side, and use a larger quantity of water.

6. The account you give of the way your toning bath behaved does not prove the hypo. to have been impure; the fault might have been in the gold. What salt did you use? Was it *chloride of gold* or *sel d'or*? The latter is sometimes adulterated to the extent of 100 per cent. The precipitate you call gold, was, in all probability, sulphide of silver.

7. Hyposulphite of soda may be tested in the following manner:—Weigh out ten grains of iodine and twenty grains of the hypo. to be tested. Dissolve the hypo. in half an ounce of water, and add to it the iodine in fine powder; allow it to stand for about ten minutes, shaking it frequently during that time. If the hypo. be pure, the iodine will have entirely, or nearly, disappeared, and if impure, some of it will be left as a black powder at the bottom; the amount of impurity in the hypo. will be in proportion to the amount of iodine left undissolved.]

TRANSPARENT STEREOSCOPIC VIEWS ON GLASS.

Sir,—I shall feel obliged if you will kindly state in the "Photographic News" by what process views on glass (stereoscopic landscapes) are obtained, as I can find no directions for obtaining them in "Hardwich's Manual of Photography."

Yours obliged,
J. C.

[We believe that a really good process for producing these pictures equal to those of Ferrier or Soulier has not been published. We have succeeded in getting them *nearly* as good by means of the collodio-albumen process, exposing the sensitive plate to gas-light under a negative, for a minute or so, and then developing with gallo-nitrate of silver. Dr. Hill Norris's plates, prepared according to his dry process, may also be used, or, in fact, any of the dry processes. We suspect that Soulier and Clouzard produce their beautiful stereoscopic transparencies in the following manner:—A pair of 8 × 10 negatives are taken in two cameras separated by desired distance; these are then placed side by side in a frame, opposite a strong light, and so arranged in a room that no light enters except what passes through the large negatives. A camera with suitable lens, &c., is then placed opposite, at such a distance that the image of the two negatives on the ground glass shall exactly occupy the space which the picture is intended to cover on the stereoscopic slide. The ground glass is then removed, and a dark slide, containing a stereoscopic plate, prepared by the *albumen process*, or some modification, is substituted for it. The plate is exposed, developed, and fixed as usual afterwards. Our reasons for suspecting that Messrs. Soulier and Clouzard use a process similar to the above are the following:—Some time ago we were examining with Professor Wheatstone several pairs of transparent stereoscopic slides, in size about 8 × 10 inches, and intended for use in his large reflecting stereoscope. One of these pictures was a well known view of Paris, and, during the examination, it was suggested to compare the effect of the large view in the *reflecting* instrument, with that of a small transparent view of the same city in the *refracting* instrument. On comparing one with the other, we could not help being struck, at first sight, with the curious coincidence of one or two objects in the same spot on each of the pairs. Closer examination, however, showed that the positives, though of widely different sizes, were from *the same negative;* passengers in the streets, boats on the river, horses and carts, were identical, and, if further proof were wanting, small imperfections and spots on the larger plates were detected, upon close scrutiny, in the small pictures. The identity of negatives could not be doubted. It then became a question of some interest as to which sized negative was the original. Were the small pictures reduced from an 8 × 10 pair, or were these larger plates magnified from a smaller pair? This could easily be discovered. The copy, whichever it might be, would show unmistakable signs of its being only a copy, in its unavoidable exaggeration of light and shade, and slight loss of the finer details in the shadows. Moreover, it would be almost certain to have, in addition to all the accidental faults of the original, some one or two of its own. These tests were applied to the two pairs under examination, and we soon found, unmistakably, that the large pair were from the original negatives, and the small pictures were reduced from these. We had now to decide as to whether the small positives were printed from negatives of their own size, or whether they were copied in the camera from the large negative. This was not more difficult to answer than the previous question. To be copied in the former way, at least three intermediate copyings would have been necessary, and photographers who have ever tried to produce a second negative from a positive, well know that after three copyings the exaggeration of contrast in light and shade must necessarily be very considerable. In the case under consideration, however, this exaggeration was only just perceptible; in fact, no more than would be the result of once copying, and as there would be very little advantage, and many disadvantages, in printing them from small negatives, we came to the conclusion, that the pictures were produced as we have described above.

One reason why they cannot have been printed from negatives taken direct from the view, is, that the view appears with the sides as in nature when looked at *through* the glass, with the picture side away from the eye, whereas a positive, printed by superposition, would have the right and left wrong when seen in that position. By being reduced from a large negative, however, the above desideratum can be produced, by placing the negatives with the picture side away from the camera.]

ACIDITY OF RAIN-WATER.

St. Mary's Rectory, September 7th, 1858.

Sir,—I am delighted to learn that the "new weekly journal of photography" is to be edited by such a veteran artist. Your name is a tower of strength. I feel that it would ill become me to make any suggestions to you, and I will therefore content myself with congratulating you on your admirable prospectus, which leads me to expect that your paper will be the *beau-idéal* of a literary and scientific journal.

Will you kindly inform me, at your earliest convenience, whether you think that rain-water which fell during the heavy thunderstorm we had here sometime ago, and which I am surprised to find has a distinct acid reaction, will be injurious in photographic operations? Also, can you explain the cause of this phenomenon? I always thought that rain-water was *pure*.

Believe me, your sincere well-wisher,
W. W.

[The phenomenon noticed by our correspondent is a very curious one, and we are not aware that it has ever been before noticed by photographers. The cause is not difficult to understand. Possibly many of our readers will be surprised to learn that the atmosphere we live in is composed of the very same elements as the most corrosive acid known—nitric acid; the difference being that in the latter the elements, nitrogen and oxygen, are united *chemically;* whilst in the atmosphere they are merely mixed *mechanically*. Under some circumstances, however, these two elements are capable of combining together in the atmosphere, and producing nitric acid; and in the case mentioned by our correspondent the electricity which was present in the atmosphere acted as the combining force, each flash of lightning giving rise to a certain very small

quantity of nitric acid, which, being washed down by the rain, caused the acidity spoken of. Fortunately however, for photographers, an electric flash is only capable of causing the formation of the merest trace of nitric acid; for, had it been otherwise, and were electricity capable of acting towards nitrogen and oxygen as it does in many other cases known to chemists, at the first flash of lightning the atmospheric elements would rush into chemical combination, and the animated creation would instantly be burnt up in a sea of aquafortis.

With respect to the injury likely to be done to photography by using this rain-water, in some instances, such as preparing solutions, the acid would be in too small quantity to do any harm. For washing positive prints, however, it might be injurious, and for that purpose we should recommend the addition of a few drops of ammonia to neutralise the acid.]

SUBDIVISION OF A DROP.—MEDIUM TINTED BACKGROUND.

DEAR SIR,—Some tyros may be pleased to know that a half, or even quarter drop of solution of carbonate of soda, which is quite enough to effect a change in a bath, may be added by dipping a clean glass rod into the soda, shaking off as much as is not required, and then dipping it into the bath. With common nitrate, prepared after Mr. Ackland's version of Fothergill's process, I have obtained, by this method, an extremely active bath.

What background, that would prove of a middle tint in a positive, is the most preferable?

Trusting that an answer to the above query would be worthy of a place in your first-rate periodical,

I am, Sir, yours very truly,
H. H.

[1. A drop may be subdivided very conveniently by adding 10, 50, or 100 drops of water, and then taking a certain number of drops of this dilute solution; in this way homeopathic doses of nitric acid are given to a bath. We have heard it gravely recommended to add the 500th of a drop of acid to an 8 ounce bath!

2. Yellow calico comes out as a good medium tinted background in a photograph. An old yellow blanket will also give a similar tint. The best plan, however, is to have a light wooden frame made, about seven feet square, and on feet with castors, to admit of being easily moved. Both sides of this may now be covered with backgrounds of different tints. A fabric must be chosen wide enough to cover it without a seam, some common kinds of sheeting calico, for instance, and this must be stretched tightly over the frame, and secured at the edges with tacks. One side of this may now be coloured in distemper with some shade of olive or gray, and the other side with the same colour of a darker tint. This latter will be found useful when gray hair or light dresses are required to be copied.]

HOW TO COMMENCE PHOTOGRAPHY.

August 30*th*, 1858.

SIR,—As I am desirous to learn the photographic art, I would be glad if you will tell me what instruments and chemicals I shall require, and what will be their cost (about).

I am, sir, yours faithfully,
E. B. G.

[By all means avoid much apparatus *for the present*. Nothing can be more erroneous than to suppose that complicated appliances are required to commence the study, and the chances are that a beginner who starts at a considerable expense will, unless he have extraordinary perseverance and courage in overcoming difficulties, will in a few months give it up in disgust. Do not *on any account* begin with attempting portraiture by the collodion process, or you will never be a photographer; but commence with obtaining an insight into the laws and phenomena of the science by copying lace, leaves, ferns, &c., on paper by super-position, then proceed to the talbotype negative process, and *keep to it*, at all events until you are so thoroughly *au fait* at the process as to be competent to decide upon the merits of the waxed paper or any other paper process. Many of our first photographers have done some of their finest pictures by the talbotype process. After having acquired some little proficiency in processes on paper, you can then get a complete set of apparatus, for the relative value of which consult our advertising columns, and try the collodion process, with good chance of success.

In our catechism we are giving a regular course of instruction in the elementary principles of photography, by means of which the student will be enabled to acquire a thorough practical insight into the properties of light and its effects upon the compounds employed in the different photographic processes, and be led by simple and progressive steps to a complete knowledge of all the processes in common use. We cannot do better than advise E. B. G. to carefully study this department of the "PHOTOGRAPHIC NEWS," and trust to our guidance to make him a good photographer.]

REMEDY FOR FILM WASHING OFF.

DEAR SIR,—I wish your new journal every success. If you edit it with your usual tact and talent, I am sure it will be the "PHOTOGRAPHIC NEWS" in truth as in name.

I am in a sad fix. The film of collodion washes off the glass, and thus I lose many tip-top negatives. Can you prescribe a remedy?

Yours faithfully,
AN F. R. C. S.

[This is a fault which collodion is very liable to have, more especially the nearly colourless varieties. It can be avoided by preparing the pyroxyline at a high temperature (see answer to "Well-wisher," No. 1, p. 11); and, in some cases, by dissolving about a grain of white wax in an ounce of collodion. Roughening the edge of the glass for about an eighth of an inch all round with a piece of coarse emery paper, or scratching it with a file, will also prevent the film washing off. The film also acquires a great tendency to wash off if much time has been allowed to elapse between developing and fixing; or if, after fixing and partial washing, the plate be allowed to become nearly or quite dry before the final washing be given to it. The film of preserved plates also has a great tendency to separate from the glass, occasioning what is called *blistering*. For this latter, no certain remedy is known. When the plate has become dry under any other circumstances mentioned above, the washing off may be prevented by applying a little spirit varnish, for about an eighth of an inch round the edge of the film.]

ANSWERS TO MINOR QUERIES.

Coloured Backgrounds.—*D. H.* asks how the beautiful coloured backgrounds, violet, brown, green, &c., are produced on glass positives. A very good plan is to put a perfectly black background behind the other, so as to have a transparent ground on the glass plate. When the picture is quite dry and ready for mounting, place a piece of good thin paper on it; and holding them together, opposite a strong light, trace the outline of the figure on the paper. Now colour the paper black where the figure is, and the other part the desired colour, and mount it behind the glass positive in the frame. Another plan is to paint the plain side of the glass, in the above manner, instead of using paper, putting black behind the figure as before. The picture can be coloured as usual on the front.

Queries on the Collodion Process.—*J. Jones.*—To take a negative portrait in from five to ten seconds, in bright weather, to be sufficiently dense to print from, is not at all a difficult matter; indeed, with anything like a good portrait lens, that would be a long time to expose the plate under favourable circumstances. The formula for your bath is the one in general use.—What is it kept "slightly acid" with? Acetic acid should be used in preference to nitric acid. The lens, a combination of 2¾ inches and 8 inches focus, ought not to be a slow one; so we conclude that you have either a bad collodion or incorrect formula for developing solution. For the latter, try:—

Pyrogallic acid	1 grain.
Glacial acetic acid	10 minims.
Alcohol	10 minims.
Distilled water	1 fluid ounce.

And, for the former, use Ponting's, Hardwich's, Thomas's, or, in fact, any respectable well-known maker's collodion.

Preserved Plates for the Positive Process.—*J. T.* is desirous of knowing how collodion plates may be preserved, so that a good positive may be obtained after being kept for some time. There are great difficulties in the way of taking good positives by any dry collodion process. A thin film of reduced silver is nearly certain to form all over the plate during development, and this, of course, would spoil a positive, although it would be of no consequence in a negative. We have not been able to succeed in taking even respectable positives owing to this cause, except by the original keeping process with nitrate of magnesia. This salt, being without action upon the nitrate of silver on the surface, does not give rise to decomposition, whilst plates prepared with any organic body, viz., honey, gelatine, albumen, &c., are nearly certain to decompose on the surface if free nitrate of silver be present. The best chance of success would be afforded by washing *all* the free nitrate of silver from the film of iodide before applying the preservative solution, but the plate would then be wanting in sensitiveness, and, consequently, hardly applicable to portraiture.

To obtain Density in Negatives.—*A Bungler* cannot obtain sufficient density in the high lights of his negatives. Try the following plan:—It will generally be found that a collodion iodised with iodide of potassium turns red on keeping, and then will only give pictures deficient in half tint, and of great density in the high lights; whilst, on the other hand, a collodion made with cadmium salt has, if anything, the opposite fault, viz., too much half tint, and insufficient vigour in the brightly illuminated parts of the picture. Choose a sample of red collodion which gives intense black and white pictures, and add it to the cadmium collodion in the proportion of two or three drachms to the ounce of the latter, trying the effect after each addition, until the desired balance, between intensity and half tone, is obtained. [We are obliged by your courteous offer of information to a "Photographic Artist." If you will send a letter to us on the subject, we will forward it to him.]

Queries on the Nitrate Bath.—*A Subscriber* has two baths, both of which worked well at first, but they have since got out of order. One of them leaves the surface of the plate greasy, so that the developing solution will not run over the plate properly, and, consequently, produces streaky pictures. The cause of this is, evidently, that the bath is too old, alcohol and ether having accumulated in it in too large quantities. It is very doubtful whether it can ever be properly mended. Try to evaporate the spirit from it by pouring it in a pie-dish, covering it with a piece of paper to keep dust out, and putting it in the oven or on the hob for an hour or two, and then adding water to make up the loss from evaporation. This may cure it, but it is a dangerous remedy, as the action of heat on the ingredients is very liable to generate a fogging tendency: if so, try if a drop of acetic acid will remedy it, and if not, we cannot help you; nothing is to be done but precipitate it, and obtain the silver from it. The second bath gives foggy pictures. Try a drop or two of acetic, or a fraction of a drop of nitric acid, that will most likely remedy it.

Views for Photographers near London.—Negative developing Solution.—*D. E.* intends spending a day in the country for the purpose of taking a few stereograms, but is at a loss to know where to go. He is only able to spare one day—starting in the morning and returning in the evening—consequently the locality must be within very moderate distance from London. We would suggest somewhere in the neighbourhood of Muswell Hill or Hornsey. A short journey by rail would bring him to Virginia Park, Windsor, which is one of the prettiest spots we know near London. We must confess great ignorance, however, on such matters, and should be obliged if some of our correspondents would favour us with their suggestions. A list of all the spots worth visiting with the camera situated within an hour's journey of London would be of great interest.—We know of no better developing solution than the ordinary pyrogallic solution for general work. We have lately been employing the following, but hardly know yet whether to recommend it or not:—

Sulphate of iron	12 grains.
Acetate of soda	6 grains.
Glacial acetic acid	½ drachm.
Alcohol	½ "
Water	6 "

It will bring out the picture after less exposure than pyrogallic acid, but we have sometimes not succeeded in getting sufficient vigour, and it is very liable to stain.

TO CORRESPONDENTS.

Aspirant.—Bromide of cadmium is a definite compound, and may be purchased at most respectable shops where photographic chemicals are kept.

A very Young Beginner.—Acetic acid in the bath may be neutralised in exactly the same way as nitric acid, remembering only, tha as it is a weaker acid correspondingly less of the carbonate of soda will be required.

A Tyro.—We cannot recommend any particular kind of collodion. The second you mention is very good, and may be obtained by ordering it of most dealers in photographic chemicals.

Hopeful.—The fault in your negatives seems to be too little half tone, and to remedy this, we advise a nearly neutral bath and colourless collodion. [See answer to "Bungler."] The printing is not at all good. Your fixing bath seems to be too old and acid, and the pictures you have sent will fade in a few months; try a fresh hypo bath.

Received too late for notice in this number.—M. D.—T. W. C.—W. H. H.—Photographer.—F. C.—Amateur.—E. C.—Focus.—G.—P. F. P.—A Subscriber.—One among the many.—An Amateur.—Enquirer.—A Subscriber at Norwich.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, addressed to the office, should be marked "private."

Letters to be answered in the current number of the "News," must reach the office not later than Tuesday morning.

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 3.—*September* 24, 1858.

MR. FOX TALBOT'S NEW DISCOVERY: PHOTOGLYPHIC ENGRAVING.

THE subject of engraving steel or copper plates by means of photography, is one which has deservedly attracted the attention of the leading men of science both in this country and on the continent.

There have been many experiments, in which, although none were quite satisfactory, there was separately demonstrated the practicability of the idea. In every attempt, indeed, however short it might fall of *desirable* perfection, there were the elements of future success, and sufficient grounds for self-gratulation on the part of the experimentalist.

They were all very wonderful, inasmuch as they were the first realisation of a great idea. But there yet remained the great objection that there was a deficiency of half-tone, and a mealiness, so to speak, in the pictures produced by these processes. It may be in the recollection of many of our readers, that there were several specimens at the Exhibition of the Photographic Society at South Kensington; those chiefly consisted of copies of war pieces by the celebrated Horace Vernet. Besides these, there were photographic copies by Richebourg, and the contrast between the photographic engravings and the photographs was indeed striking. In the one the half-tones were all rendered in a beautiful manner; while in the other there was a manifest hardness, and a decided preponderance of white and black throughout the pictures. So astonishing, however, was the result of these first attempts, that the discoverer might well have felt satisfied with his success, and have allowed the engraver to add the finishing strokes.

We have recently been favoured with the inspection of some new photographic prints, or, to speak more correctly, *photoglyphic* engravings, executed by a new process, the result of experiments made by Mr. H. Fox Talbot. By means of his invention common paper photographs can be transferred to plates of steel, copper, or zinc, and impressions printed off afterwards with the usual printer's ink. Pictures to be copied by this process require to be positives, and should possess clear definition when looked at as transparencies. Of course faintly-printed photographs are more difficult to render than those which are more distinct, and, as a general rule, it will be found that positives on glass are, by this new process, best adapted for copying. In the case of rare engravings, nothing could be better calculated for multiplying copies, because these are always easy to copy in plain photography.

The plates engraved by this mode are indeed beautiful in themselves as photographs, and will bear strong microscopic inspection, the most minute detail being given with astonishing fidelity. Of course prints taken from them on paper have not quite the same delicacy and minuteness of detail, neither could this be expected.

We are as yet not permitted to give publicity to the details of the process, but we can say that the scientific facts upon which the process is based are among the most striking in photography, which, as our readers are aware, is an art fertile in singular novelties. The specimens which Mr. Talbot has favoured us with of this new branch of art are very beautiful. They are free from many of the imperfections which were so evident in former attempts, and the manner in which the half-tones are given is really wonderful; the specimens are of various subjects, showing the perfection which can be obtained in any branch of pictures. Even in these copies the detail is so fine that when a powerful microscopic power is brought to bear on them, we are enabled to trace the names in the shops in the distance, and easily read the play-bills in the foreground, and this in a picture only a few inches square, while the minuteness in architectural subjects is most remarkable. In a view of Paris there is all that can be desired in half-tones, and the perspective is almost as good as in a photograph.

To show the diversity of subjects illustrated by this art, we cannot do better than name some of the prints before us; "Bridge over the Moldau," Prague; this picture contains much detail worthy of admiration, although it scarcely has the same delicacy of half-tint which some of the other pictures have; this we apprehend arises from the mass of water, which occupies a large white space in the middle of the picture. "The Great Bell of Moscow" differs very materially from the preceding, and may be considered as one of the most successful of the series before us; the half-tones are perfect in their gradation, and by means of a high magnifying power we are actually enabled to decipher the inscription on the bell. "The Temple of Edfou," Egypt, one of Frith's views, is, even in an artistic point of view, almost equal to the brilliant photographs with which that eminent photographer's name is associated; but how much more permanent! "Court of Lions," Alhambra, Granada, is not so successful as others, but this arises, we imagine, from the defects of the picture of which it is the copy. The details on the capitals of the columns are rendered with much accuracy, although in the line of perspective this is less perceptible. "Palace of the Duc de Montpensier," Seville,—here we have a charming bit of architectural detail, and, at the same time, a careful gradation of tint. "The New Louvre," Paris,—this picture is lightly printed, and the dark shadows are marked rather strongly, while the foreground is more varied. The detail of the exterior is not so well defined as we have sometimes seen it in photographs. "The Gate of the Cathedral of San Gregorio," Valladolid, is a picture in every way adapted to display to the best advantage the photoglyphic art, as in the architectural detail there is an opportunity for showing the

accuracy, and, at the same time, the beauty of this celebrated building.

In conclusion, we beg to acknowledge, with thanks, Mr. Talbot's courtesy in thus making us acquainted with the results of this important discovery; and we have the pleasure of informing our readers that he has kindly promised us, for an early number of the "Photographic News," a full account of the process, together with an engraved plate, which will enable our readers to appreciate the beauties of this new art of photoglyphic engraving.

THE STEREOMONOSCOPE.*

BY M. A. CLAUDET.

The difference between ground glass and paper, consists in this:—The process of grinding the glass does not destroy its transparency—it only disarranges the parallelism of the molecular surfaces, through which the incidental rays have had a free passage when the angles of refraction have coincided with the optic axis. Through these numberless molecular surfaces, each perfectly transparent, and acting like so many prisms or lenses, more or less inclined, each eye sees the rays, the incidence of which coincides with the optic axis. But the same eye cannot see those rays of another incidence which emerge through the molecular surfaces in the direction of the other eye. Consequently, each eye can only see the rays of which the incidence and the emergence fall perpendicularly on the pupil, and all the others are invisible to it.

It is not so in the case of paper, which, being entirely opaque, arrests all the rays which illumine it from behind. These rays, as if proceeding from self-luminous paper, diverge in all directions, and fall equally on the line of the optic axis, irrespective of the angle which they form with the surface of the paper.

All these investigations support the theory which explains the cause of the relief of the image produced on ground glass in the camera, and I do not think this theory admits of contradiction. It is evident that relief results from the presence of two superimposed images of different perspectives, each visible only to one eye, and invisible to the other; and that this phenomenon is the result of the property possessed by ground glass, of refracting through the transparent molecules of its surface all the rays which strike it, and that when their incidence coincides with the optic axis they are visible. But as each optic axis can only coincide with the incidental rays proceeding from the opposite side of the lens, the right eye alone sees the image refracted by the left side of the lens, and the left eye that which is refracted by the right side of the lens. Such is the real cause of the production of two images of different perspectives, which, although superimposed on ground glass, are not visible to both eyes at once.

The consideration of this phenomenon, and of the cause which produces it, suggested to me the idea of making a curious application of it, that should consist of the construction of an apparatus, in which two photographic images of different perspectives should be superimposed on the same ground glass, so that presenting to the eyes an image *apparently single*, this single image should produce the same relief or the same stereoscopic effect as we obtain in the common stereoscope.

Beholding for the first time so extraordinary an effect, without knowing the arrangement of the apparatus and its properties, we should not be able to conceive how an image, having the appearance of an ordinary picture, could produce the stereoscopic effect. Taking this into consideration, it appeared to me that, if I succeeded, I should solve a new and curious optic problem, the observation of which would surprise scientific men, while its practical application would prove a source of universal interest and pleasure. Accordingly, I set to work, and after the difficulties which generally accompany the realisation of any new idea, I obtained a greater success than I had dared to look for, in achieving the construction of the instrument I am about to describe.

THE STEREOMONOSCOPE.

[*Engraved direct from the photograph on wood. The process for obtaining which will be explained in an early number.*]

I have called it the "Stereomonoscope," not that I wish by this word to have it understood that, in reality, one single image could produce the stereoscopic effect (such an assertion would savour but little of science), but because I could not find a more concise expression, or one that would more clearly define the phenomenon resulting from an image which, in our judgment, we behold single, but which, nevertheless, offers all the peculiarities of relief that we obtain in looking at two separate photographic images, the visual coincidence of which can be effected either by the refraction of prismatic lenses, or by a certain degree of convergence of the optic axis.

This is the description of the stereomonoscope. As we shall see, it is, in fact, only an ordinary camera, to which two achromatic lenses are adapted. The camera should be sufficiently long to admit of extending the focus and amplifying the image at will.

The two lenses are each fixed on a frame, which slides horizontally by means of a groove. This admits of giving the necessary freedom to enable the two stereoscopic images

* Concluded from p. 15.

(placed before the camera) to be each refracted on the centre of the ground glass.

The two stereoscopic images are separately mounted, and can equally (each sliding in a groove) be placed before one of the lenses in the position the distance of the lenses requires. By means of screws adapted to the frames containing the lenses, and to those containing the images, we can gradually, and with the greatest precision, place them nearer or at a greater distance, to make the two images coincide on the ground glass, until they blend into one single image. The more you lengthen the focus, the more you must separate the images.

As in the ordinary stereoscope, when the two images are on glass, they must be lighted behind, and if they are on paper, or on daguerreotype plates, the light must be reflected on these surfaces.

The image of the stereomonoscope being represented on ground glass, in the focus of the camera, in order to examine it, we must prevent the ground glass from being lighted on the side of the spectator. Consequently, if we place the apparatus before a window, to light the two stereoscopic images by transmission, we must surround the aperture of the camera containing the ground glass with a large black screen, entirely hiding the window. The same black screen produces the desired effect, if the images are lighted by a lamp, to be seen at night in a drawing-room.

Besides the amplification of images, by lengthening the focus of the camera we may further amplify them, and at the same time augment the stereoscopic effect by placing a large convex glass before the ground glass, and by means of this convex glass (through another singular optical effect) the further we go from the ground glass the larger the image appears.

Thus the image can be examined as well at a distance as close at hand, and at a distance many persons can see it at the same time, without losing the stereoscopic effect, and without experiencing the fatigue that results from examining the ordinary stereoscope. Another great advantage offered is, that the spectators of this instrument are enabled to exchange opinions and to communicate the impressions they have simultaneously received from the spectacle before their eyes.

By inverting the order of the images placed before the camera the effect on the ground glass becomes pseudoscopic; but in looking with a pseudoscope, the effect becomes again stereoscopic. In like manner, if the images are placed before the instrument in their natural order, the stereoscopic effect on the ground glass becomes pseudoscopic, if we behold it with a pseudoscope.

Supposing we look at the image on the ground glass, closing one eye, it loses its relief, in the same way as when, in bending the head, we look with the two eyes placed on the same vertical line.

In short, all the phenomena observed on the natural image of the camera are presented on the image of the stereomonoscope, and they corroborate the truth of the principles on which are founded the theory of this new discovery—a discovery that must take its stand among the most astounding facts in optics.

TO CLEAN A GLASS PLATE.

AT the last *séance* of the French Photographical Society a conversation arose respecting the best method of cleaning glass plates for photographical purposes. M. Paul Perrier stated that M. Bayard recommended that the glass should be fixed in a frame by means of a wooden screw, which is called in the Parisian photographical instrument shops, "*Un vis à nettoyer les glaces.*" The surface of the glass should then be washed with a mixture made with clean water and tripoli, strongly impregnated with nitric acid, then rubbed in a circular direction with a piece of flannel rolled up in a lump, and before letting the mixture dry the tripoli must be got off by rubbing the glass longitudinally with a second piece of flannel, and subsequently the glass should be rubbed circularly with another piece, and then if the glass be brushed with a badger's-hair brush, it will be found perfectly clean. M. Frank de Villecholes then stated that he cleaned his glasses without washing them either with acids or alkali (?), but with a mixture made with water, ammonia, and emery, and that after using this mixture he wiped them, and subsequently washed them with a mixture of alcohol and water. This method, he said, imparted to the glasses a perfectly clean surface. M. Arnaud stated that he preferred the following plan:—He put all his glass plates in the stone sink where all the washing water (containing cyanide of potassium) was poured. If the plate had been varnished, it should remain there for seven or eight hours; but if not, a very short time would suffice. When removed from this liquid the glass was merely to be rubbed with the hand, washed in a large quantity of water, and then wiped dry. When required to be used, it was only requisite to pour on it a drop of very pure alcohol, and then to clean it off with two successive pieces of *papier Joseph* (fine filtering paper).

Doubtless, either of these plans will bring about the "consummation devoutly to be wished." We have tried almost every imaginable plan, and must give our preference to some solution which we obtained of Mr. Warwick, 32, Sloane-street. A few drops of this preparation are to be applied to the surface of the glass, and after they have been rubbed smartly over the surface, the plate must be cleaned again with a piece of linen cloth, and finally polished with a leather. This takes hardly more time to perform than to read, and it really does its work in so perfect a manner, that, although we do not usually like to recommend secret preparations, we feel that to do so in this case will be to confer a boon on photographers in general. Since using it, we have never had a dirty plate.

New Discoveries.

THE PHOTOGRAPHIC VALUE OF THE URANIUM PRINTING PROCESS.

IN the last sitting of the French Society of Photography, M. Humbert de Molard gave an account of some experiments he had made relative to the pretended unalterability of pictures obtained by means of the nitrate of uranium. M. Davanne afterwards presented proofs obtained through the same process by M. de Brebisson, and read a note on the subject which we reprint below. These proceedings were followed by a very animated discussion on the subject of the new process, and we regret to state that M. Nièpce de St. Victor did not find many defenders. The adversaries of the new process were numerous, and their opposition was characterised by a considerable degree of bitterness.

Although we are far from sharing the too absolute opinions expressed, we cannot but acknowledge that the new process has not fulfilled the expectations entertained of it; thus it is now averred that with the nitrate of uranium proofs are as easily alterable as those obtained with the chloride of silver, and as a result have hitherto produced nothing very perfect.

The name of M. Nièpce de St. Victor is dear to photography, and no person will contest the multiplicity and importance of his labours; it is only to be regretted that his researches with respect to the properties of the nitrate of uranium have been proclaimed in such magniloquent terms. According to certain persons, the new discovery was a real revolution in photography; it ought to be adopted immediately, to the exclusion of all other processes; the proofs were magnificent, their unalterability perfect; boiling cyanide of potassium respected them; and aqua regia alone had the power of affecting them. What is now the result of all this trumpeting? A marked dislike of the new process; those who have tried it and who have not succeeded to the extent of their wishes declare it detestable; this is the angry expression of disappointment

of people who have been promised a mine of treasure to work, and who find themselves deceived; but this does not prove that the researches of M. Nièpce de St. Victor with respect to the nitrate of uranium are without very great importance; in our opinion the new process, when modified and tested by experienced photographers, may produce good results.

"The experiments which I have made (says M. Humbert de Molard) are only the complement of the communication which will be made to you in a few minutes, of the otherwise important experiments of M. de Brebisson. One thing which surprised me in the paper on the employment of the salts of uranium was the positive nature of the process. That which was stated of the unalterability of the proofs especially surprised me. The nitrate of uranium process is new, and on this account it ought to be received with favour. It cannot be known yet to what it may lead; but I must observe that those persons who have announced it as the *ne plus ultra* of photography are decidedly in the wrong. The proof I hold in my hand was given to me by M. de Brebisson. It was asserted that the nitrate of uranium resists the action of boiling cyanide of potassium: I submitted a part of the proof to cold cyanide, and in five minutes that part of the picture had disappeared. I submitted another portion to ioduretted cyanide, and it disappeared immediately. I employed successively hydrochloric acid, aqua regia, an aqueous solution of bromine, chloride of iodine, hyposulphite, and in fifteen minutes nothing remained of it. Ammonia alone did not deteriorate it; on the contrary, it improved it. In fine, I would not ask more than five minutes to destroy any proof taken with the nitrate of uranium. Having a desire to see how it would act in the camera, I operated on the surface of a large plate with a German quarter-plate object glass, and in four minutes I obtained these indifferent proofs; at present the nitrate of uranium process is worthless for negatives, while as to the much vaunted durability of the positives, it does not exist. For the rest, reflection should have suggested this result of the experiment. Whence arises the alterability of ordinary proofs? From the alterability proper to the salts of silver. Now to develop the nitrate of uranium proofs nitrate of silver is employed, and the salt of silver being the principle of destructability, it matters little whether it be employed before or after.

"Considering this process in reference to its novelty, we cannot discover in it anything absolutely new; it has, moreover, much analogy with that published by Herschel in 1842, under the name of *chrysotype*, and which differed from it only in the nature of the salt employed. . . . My conclusion is that the indestructability imputed to the nitrate of uranium proofs is a chimera, and that the process in its principle is not absolutely new, since that of Herschel led to the same result. Still, if it is not the *ne plus ultra* of photography, it may assist us in obtaining excellent pictures with time and experience. The process is good in this sense—that it is an addition to photography. I beg the Society to keep in sight the fact that M. de Brebisson and I engaged in these experiments with totally opposite views. He wished to demonstrate that great things might be accomplished by the new process, and he has succeeded. I, that there was no durability in it, and I too have had the misfortune to succeed."

The paper of M. de Brebisson was as follows:—"My experiments on the occasion of the discovery of M. Nièpce de St. Victor were made without any other instructions than those furnished by the photographic journals, which were very incomplete, and which I anticipated in my impatience to become acquainted with the advantages promised us. In my isolation I have not been well able to appreciate the value of the results I have obtained; to do so, I must have had some with which to compare them, and at this moment, even, I have not seen any nitrate of uranium proofs other than those I have myself made; consequently, I don't know whether they are equal or superior to others obtained by the same process. . . . Several members of the Photographic Society having assured me that any details relative to the experiments I have made would be received with indulgence, I forward to the Society some proofs with this note, not as models, but simply intended to illustrate certain observations which follow. . . . For the preparation of positive paper, I generally use a solution of 12 parts of nitrate of uranium to 100 of distilled water or rain-water. Although the employment of straw paper was recommended, I have been content with Saxony and Canson's negative papers, which are fine and thin. They wash more easily and divest themselves better of the salts of uranium and silver with which they are impregnated. I plunge the sheet of paper in the solution of the nitrate of uranium for about two minutes; sometimes I only impregnate one side of the paper, but that which has been entirely submerged appears to me to give the most vigorous proof. The paper thus prepared is less sensitive to the influence of light than that prepared with the chloride of silver. To make a deep impression upon it, a very vivid insolation under a very transparent negative is necessary. . . . It will be very difficult to obtain, through this process, a good proof by means of diffused light.

"The bath I prefer for the developing liquid, after numerous essays, is 3 or 4 parts of nitrate of silver in 100 parts of distilled water. This bath will serve until it is exhausted. I added to this solution some drops of acetic acid; but when it had been used for a few proofs the quantity of nitrate of uranium which mingled with it naturally made it very acid. I have developed one half of a proof in a bath containing 2 per cent of nitrate of silver, and the other half in a bath containing twice that quantity, and both presented the same intensity. . . . To remove the reddish colour which the nitrate of uranium generally gives, I add to 200 parts of water 20 to 30 parts of a solution of chloride of gold at 1 per 1000. The tone of the proof when plunged in this dilute solution speedily changes, and in two or three minutes it will have acquired a suitable degree of intensity. If the action of this bath is prolonged the tone becomes of a disagreeable blue-black. . . . However feeble may be the dose of nitrate of silver employed in the developing bath, there always remain portions of this salt in the substance of the paper, notwithstanding that the repeated washings and exposure to the light give it a reddish tinge. The principal advantage of the new process consisting in proscribing the fixing by the hyposulphite of soda—the salt so hurtful to the future of photography—I attempted other means of getting rid of the non-reduced nitrate of silver, or, at any rate, of neutralising its dangerous effects. Ammonia renders the washing more efficacious, but not complete. Water containing chloride of sodium did not altogether succeed, and at last I determined on trying a new solution of hyposulphite of soda at 8 per cent. I then placed the proof in water, which I renewed from time to time. . . . The development of the picture by means of the chloride of gold alone, or by the bi-chloride of mercury, yielded no satisfactory results, and I may almost say the same of the iron bath suggested as having been used by M. Haudoy with satisfactory results. Nevertheless, by putting about 20 parts of a saturated and acid solution of protosulphate of iron into 200 parts of water, I have succeeded in getting proofs of an agreeable bistre tone.

"I have also tried, after M. H. Draper, the positive paper impregnated with a solution of nitrate of uranium. The proofs, after a long insolation, were scarcely visible, and were of a reddish tone, and without vigour. I should not mention this, if I had not obtained by this process two rather curious effects of colouring. One proof, on paper thus prepared, plunged in a very feeble solution of chloride of gold, gave a picture of a yellow colour, inclined to orange; and a beautiful rose tint spread itself over another positive, after its immersion in a very extenuated protosulphate of iron bath.

"As yet I am afraid to pronounce upon the durability claimed for the nitrate of uranium proofs. Possibly the substances I used might not have been pure. It is, perhaps,

from this cause that I have found so many salts capable of assailing these proofs. Iodurетted cyanide of potassium has such an effect upon them, that characters traced on their blackest parts with a pen charged with this liquid become of a pure white, even before they are dry.

"If I may be allowed, in terminating this paper, to venture an opinion on the new nitrate of uranium process, I will observe that it offers great advantages by the simplicity of the preparation of the paper, by the easy development of the picture, and especially by the saving which results from the small proportion of nitrate of silver necessary. But the development is abrupt, almost unexpected, and would lead to frequent miscalculations. The picture that the light traces upon the paper is so decided, that one cannot tell the precise moment when the luminous action ought to cease. Hence an uncertainty, which makes success depend on chance. . . . ."—*Revue Photographique.*

Critical Notices.

THE PHOTOGRAPHIC EXHIBITION AT THE CRYSTAL PALACE.

FIRST NOTICE.

It is a happy idea, on the part of the directors of the Crystal Palace, that in addition to the already long list of attractions, there should be added another item—in other words, a Photographic Gallery. This is as it ought to be. Photography has now assumed a very important position among the arts and sciences, and it is only fitting and proper that it should have appropriated to itself a court or gallery at Sydenham, and that in that court there should be a collection which should in every way be worthy of the importance of the art and the Palace. Fresh discoveries are being made every day, and every day we find out some new application of this wonderful art, whether it be a means by which we can the more easily detect a prisoner, or record the rapid flight of a cannon ball through the air. When first we heard of the idea of a photographic collection at Sydenham we thought that not only were the directors taking proper steps in regard to making the Palace even more attractive to the public than it is at present, and not only were they taking a course which must tend to increase their dividends, but that they were placing a means within reach of the photographic world of keeping a record of the progress which the art is daily making. We thought that it must be indeed a pleasing feature in the attractions of the Palace to the amateur or beginner in photography that here he might have an opportunity of consulting the best results of each particular "process," and thus be enabled to judge of the efficiency or inefficiency of any particular mode of development, and that in this way the Sydenham Gallery might become an object of constant interest not only to the amateur, but to the public, who, having no means of seeing the progress in the art except in the shop windows, and not feeling sufficient attraction or interest in a simple exhibition of photographs, they might, by the more frequent familiarisation of the eye with photographic progress, acquire a more widespread interest than they do at present.

These were some of the thoughts which occurred to us, we say, when we heard of a Photographic Gallery being about to be formed at Sydenham, and with every desire of being *au courant* in all that relates to photography, and that we might (as it is our desire and intention) keep our readers equally so, we proceeded last week to Sydenham for the purpose of inspecting "The Photographic Collection." We cannot but express disappointment at the almost entire absence of new pictures. It was to us by no means a new exhibition. Wherever we turned it seemed as though an old friend nodded to us, and that with an almost self-complacent air. Here we met with one whom we had first known at Manchester, and with whom we had afterwards renewed acquaintance at the South Kensington Exhibition; but not content with this, it again made its appearance in the Coventry Street Exhibition. This we had thought the culminating point of re-exhibition, but what was our astonishment to meet again with these old friends who seem to have retained (notwithstanding their exhibitive campaigns) all their juvenescence. The reader will be inclined to agree with us, that the least thing that could be expected, was some new pictures on the occasion of opening a Photographic Exhibition at the Crystal Palace.

Of course it may be urged that just at present there is some difficulty in obtaining new photographs; then why not delay the opening and wait until such time as they are obtainable? By all means let the present collection be replaced with something which shall reflect credit upon the Palace, and the art.

There is in the Crystal Palace Gallery, as far as regards light, arrangements for hanging everything which can conduce to a successful exhibition. The screen saloon principle we very much admired, and for such a gallery as that at Sydenham it is decidedly preferable. In the Art Treasures Exhibition at Manchester, the screen was used, but owing to the narrowness of the gallery the saloon principle, which was carried out in the picture galleries on a large scale, could not be introduced in the Photographic Gallery, as that portion of it which was appropriated to photographs was in such close contiguity to the orchestra that for three or four hours in the afternoon it was impossible to examine any of the photographs in the front of the screens, owing to the crowds who listened to the music. The saloon principle was admirably carried out at the fourth Kensington Exhibition, and it could not but strike the visitor how much it conduced to his comfort in examining the photographs, since it enables people to inspect the pictures in peace without that continual throng which is always passing behind them, when pictures are hung in long lines. The colour of the screens, which is a neutral or tea green tint, is admirably suited for as a background, and where there are spaces, which must necessarily occur now and then between the frames, it never obtrudes itself as more staring colours do, nor does it offend or strike the eye as disagreeable. It is worthy of notice how different is the effect here from that produced at Coventry Street, where there were dark rooms and bad light, and, to make things worse, a dirty looking background which gave a sombre appearance to the room that was anything but agreeable.

Of course those works which are new deserve our first attention, and amongst these we may mention Herbert Watkin's series of portraits of contemporaneous celebrities. These will no doubt prove interesting to the general public, who will be anxious to behold the lineaments of those about whom they may have heard or read much. Who, for instance, would not feel interested in seeing the portrait of William Howard Russell, the Crimean and Indian special correspondent of the *Times?* he who has certainly raised the profession of "special correspondent" to an enviable position; who has thrilled the world with wonderful descriptions, and astonished it with his keen observations. He is indeed the photographer of life as it is. With all the correctness of the camera does he transmit pen-and-ink pictures to paper, which make the blood of the reader circulate the faster by the wonderful power of his word-painting. We say, who is there, then, that would not feel a great desire to look on him as he really is, with his smiling face and patriarchal beard? None, we will venture to reply; and so might we say of each celebrity, who in the circle in which he moves is a centre around which many admirers revolve, be that circle political, literary, artistic, dramatic, or scientific. This portion of the Exhibition will at all times prove an attraction, though to speak of the pictures from a photographic and artistic point of view, we cannot say that we admire them much. We think that it will not be denied that generally the human face has some defect or other, which, as we have it constantly before us, we do not so readily notice; but the moment that the face is portrayed on the

glass or paper of a photograph, when there is the absence of that colour which hides what is here a perceptible defect, it is immediately noticed, and the photograph, though a good one, is condemned as being a bad likeness; another view is taken, possibly so as to exclude the defective part, and then we have what is termed a good portrait, which in reality is only half of the truth, but decidedly the pleasantest half, because it administers to the vanity of the sitters by the exclusion of what would be painful. If, then, this much can be said of ordinary plain photographs, what must be said of such exaggerated pictures as those of Mr. Watkins, where every one of the defects (which perhaps under other circumstances would hardly be noticed) is brought forward with faithful yet painful fidelity? To show that we are not taking too extreme a view of the case, we cannot do better than refer the reader to a hideous portrait of the eminent tragedian Mr. Barry Sullivan, which is here given with an alarming reality; all the smallpox marks which unfortunately that gentleman has on his face are here so exaggerated, that on inspection the face looks as though it were taken upon a coarse-grained canvas. Then there are other faces—for instance, those of Mr. Robert Bell, Viscount Combermere, Lord Palmerston, and many others—which look decidedly repulsive, but the portraits of those whom time has furrowed are the least able to bear exaggeration. All this series are given with a truthfulness free from flattery, which makes the human face appear anything but divine. The whole of these photographs are open to the above objection of exaggeration. Some faces do not suffer so much as others, but speaking generally we think it desirable that the size of these pictures should be smaller, and then they would be free from their most objectionable traits.

Photographic Chemistry.

CHEMICAL NOMENCLATURE.

(Continued.)

It is unnecessary that we should pursue this portion of the subject any further; we shall therefore turn from the spoken to the written language of chemistry. Instead of occupying space and time in inditing the names of simple bodies at length, it is customary to indicate them by a symbol; thus, As signifies arsenic, N nitrogen, S sulphur, &c. A combination of two letters is written by means of the symbols placed side by side without any stop between them; thus Na is the symbol of natron, the Greek for sodium, O of oxygen; Na O therefore signifies oxide of sodium; the formula of which is thus written, Na O. If several equivalents of a simple body enter in combination, the number is told by a small figure placed at the right of the symbol of this body, a little below it. $S\,O_3$ is the equivalent of the sulphuric acid formed of one equivalent of sulphur and three equivalents of oxygen. To indicate several equivalents of sulphuric acid, a figure is placed before the entire formula of that acid:—$2\,S\,O_3$ means two equivalents of sulphuric acid. The cipher placed to the left of a formula multiplies the entire formula until it meets with one of these signs—+, —, =, plus, minus, equal to.

A few examples will suffice to render the use of these symbols easy of comprehension. Example:—$Pb\,O + S\,O_3,\ H\,O = Pb\,O,\ S\,O_3 + H\,O$, signifies one equivalent of oxide of lead, *plus* one equivalent of sulphuric acid united to one equivalent of water (what chemists term monohydrated sulphuric acid), produce one equivalent of oxide of lead, *plus* one equivalent of water. $Cl\,O_5,\ K\,O — O_6 = K\,Cl$ means chlorate of potassa, from which six equivalents of oxygen have been withdrawn, leaving as residue chloride of potassium. $3\,S\,O_3 + Fe_2\,O_3 = Fe_2\,O_3,\ 3\,S\,O_3$, or $Fe_2\,O_3\,(S\,O_3)^3$ is understood thus:—three equivalents of sulphuric acid (+) *plus* one equivalent of sesquioxide of iron (=) produces one equivalent of sulphate of sesquioxide of iron. All photographers are familiar with the nitrate of oxide of silver, more commonly designated nitrate of silver,—an erroneous expression, but sanctioned by custom. The composition of this salt is as follows:—Nitrogen uniting with oxygen forms nitric acid; one equivalent of this acid contains one equivalent of nitrogen to five of oxygen. Silver combined with oxygen constitutes oxide of silver, which contains one equivalent of silver to one of oxygen. One equivalent of nitric acid united to one equivalent of oxide of silver, gives therefore one equivalent of nitrate of oxide of silver; or, in symbols, $Ag\,O + N\,O_5 = Ag\,O.\,N\,O_5$.

(To be continued.)

Dictionary of Photography.

Accelerating Agent.—A name given to those substances which hasten the action of the luminous rays upon a sensitive photographic compound. In the collodion process, accelerating agents are chiefly confined to substances to be added to collodion. The addition of a saturated solution of chloride of sodium has been suggested by Herr L. G. Kleffel, in the proportion of six drops to an ounce of iodised collodion: this mixture is to be shaken for five minutes, and then allowed to stand for twenty-four hours, that all the floating particles may settle. It must then be carefully decanted into a perfectly clean, dry bottle. This is said to greatly increase the sensitiveness of collodion when new, and also to restore, in a great measure, the sensitiveness of old collodion, which has deteriorated through age.

Mr. A. Maconochie has recommended the addition of two or three drops of an alcoholic solution of protoiodide of iron, to each ounce of a stable, iodised collodion. Positive collodion will be found to answer best for this purpose, as the greater tenuity of the coating of iodide of silver renders it easier impressible. The collodion, after mixing, can be used at once, but no more should be prepared than is wanted for immediate use, as it will not keep good longer than a few hours. Under some circumstances the outline of the picture can be traced on the plate after exposure, even before the developing solution is applied. In case the deposit of silver on the plate is not found to be sufficiently dense to print from, it may be strengthened by washing over the plate, after fixing and washing, but before drying, a dilute solution of terchloride of gold. This will be found to add considerably to the density of the picture when viewed by transmitted light; a deposit of metallic gold being precipitated on the silver already on the plate. By this means prints can be obtained from feeble negatives, as intense as if they had been good negatives from the first.

Mr. Parr has recommended the employment of acetate of soda as an accelerating agent in the nega-

tive paper process. He proceeds in the following manner. Canson's negative paper is immersed for three minutes in the following bath :—

Iodide of potassium	75 grains.
Bromide of potassium	25 "
Acetate of soda	30 "
Iodine	5 "
Water	10 ounces.

It is then to be hung up to dry. When required to be used, the paper is to be made sensitive in the following solution :—

Nitrate of silver	38 grains.
Glacial acetic acid	1 drachm.
Water	1 ounce.

Two drachms of the above solution are to be poured on a glass plate, and, after being distributed uniformly over the surface, a sheet of paper 9 × 7 inches is to be floated on it, until the dark purple colour has entirely disappeared. The superfluous nitrate of silver is then to be drained away, and preserved for developing, and the margins of the glasses blotted dry. The sheets of paper are now ready to be placed in the camera, the glass on which it has been excited serving to support it, and retain the moisture. The paper will keep good for several hours. After exposure in the camera, the image may be developed with gallic acid, the drainings from the sensitising process being added at last, if necessary. The remainder of the process is the same as that usually adopted; after the pictures are finished they may be waxed.

Acetate of soda may be used as an accelerator in the collodion process. 4 grains of dry acetate of soda, and 4 grains of iodide of cadmium to the ounce of collodion, give a strong impression in about the ninth part of the time of ordinary collodion, which is quite free from any symptoms of fogging. Collodion so prepared, however, will not keep more than a few hours.

(To be continued.)

[Press of important matter at the last moment has rendered it necessary to curtail the "Chemistry" and "Dictionary."—ED.]

A Catechism of Photography.

LIGHT—*(continued)*.

Q. What is known respecting the illuminating power of light?

A. From the philosophical researches of modern times it is shown that certain rays of light possess a more intense illuminating power than others. The maximum intensity of light is in the yellow, and the minimum in the violet.

Q. What is meant by the caloric property of light?

A. The intensity of heat which is shown to vary in the different coloured rays. It increases from the violet to the red. Some writers have fixed the maximum in the dark stripe which bounds the red, others in the red itself; but the difference appears to depend on the nature of the refractory prism.

Q. What are the chemical properties of light?

A. In addition to the illuminating and calorific powers in every ray of light, there is united another and perfectly distinct principle, as distinct from light as light is from heat. This principle is called actinism, and it has the power of decomposing chemical compounds.

Q. Is not this principle the groundwork of photography?

A. Yes; actinism is the grand principle of photography, as it is simply by the action of this principle on certain chemical compounds, that photographic effects are produced.

Q. May we not say that light exercises this influence and produces this effect?

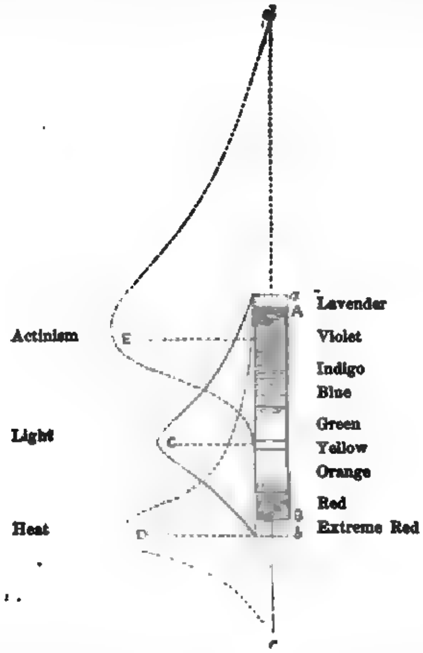
A. We may use the term light in a general sense, but it is not philosophically correct. It is not light, but only a component part of light, the influence of which is exerted in photography. A broad distinction should be made between light and actinism.

Q. Explain the difference.

A. White light consists of seven colours—three primary, red, blue, and yellow; and four formed by combination of these three—violet, indigo, green, and orange. Thus a ray of white light may be described as a bundle of rays, exercising different influences. Some of the rays giving more light than others; some of them giving forth more heat; and others—as the violet—exercising the greatest power in decomposing certain chemical salts having a metallic base.

Q. What is this called?

A. *Actinism.* Various terms have been suggested as appropriate to distinguish this principle, and that of *actinism* (from the Greek word *actin*, a ray), though open to some objection, is now generally adopted.



In the above diagram we have a representation of the threefold property of light. The shaded portion shows the colours as they occur in the decomposed solar beam, and the curved lines indicate the relative amount of actinism, light, and heat, the former of which is greatest at E, light being most intense at C, and heat greater at D.

Q. How can we assure ourselves that a *separate* chemical principle exists in the solar ray?

A. Because we can separate it from heat and light. There are certain media through which, if we pass a solar ray, one or two of its elements may be separated from the others; thus a ray of light passes easily through a transparent plate of alum, but nearly all the heat is absorbed. Certain dark coloured bodies allow nearly all the heat to pass and obstruct the light. A blue glass obstructs nearly all the light and heat of the solar ray, but allows the actinic or chemical principle to pass freely; while a yellow glass allows the light and heat to pass, but obstructs the passage of the chemical influence.

Q. When light is decomposed by a prism, what are the relative positions of these three different principles?

A. All these are refracted, but the *calorific* principle the least of any. Its maximum point is but slightly thrown out of the right line which the solar ray would have taken had it not been intercepted by the prism.

Q. How is the *luminous* principle influenced?

A. It is subject to a greater degree of refraction than the calorific principle.

Q. What is the position of the chemical or actinic principle?

A. The radiations which produce the chemical change are more refrangible than either the luminous or calorific principles. The maximum of this power is to be found at the point where light rapidly diminishes, and where heat can scarcely be detected.

Q. What curious fact was there elicited?

A. That no substance can be exposed to this actinic principle without undergoing a chemical change.

(*To be continued.*)

Correspondence.

SEA-SIDE PHOTOGRAPHY.

Ramsgate, September 20.

Dear Sir,—The first two numbers of the "Photographic News" have reached me in this paradise of photographers, nigger melodists, and donkey drivers, and I trust that photographers, both professional and amateur, will not be slow to perceive the advantages of possessing an organ of publicity which can be maintained at so trifling an expense to each, and calculated to be of such essential service to all. I am myself a photographer, though only an amateur, and, as such, have devoted myself almost exclusively to experimental researches; and for this reason have kept myself *au courant* with the photographic literature of the continent, and am, in consequence, deeply impressed with the *necessity* for a publication which will keep English photographers acquainted with the progress of the art upon the continent; and thus prevent any among them from again incurring the humiliation of announcing that as a discovery which has long been familiar among continental photographers, and at the same time prevent the latter from assuming all the credit of discoveries which may have been previously made here. Had the "Photographic News" existed three or four years ago, it is probable that Mr. Burnett would have then published his discovery of the extraordinary effects of light, and in that case further researches would undoubtedly have led to the discovery which has given so much celebrity to the name of M. Nièpce de St. Victor.

I perceive that at the commencement of this letter I have coupled photographers with individuals who are deemed somewhat low in the social scale; but the photographers I allude to may be termed the *Bohemians* of the profession—men who get their living by starting a shop for the sale of photographic portraits, without the most distant idea of the simplest principles of the art. In this town, where it appears to be as much the custom for the ladies who are staying here to have their portraits taken as to take a bath, these shops abound; and invitations to have one's portrait taken for sixpence, with a discount of 18 per cent. on taking a dozen, are numerous. Whether any ladies are so enamoured of the sight of their own pretty faces as to avail themselves of this opportunity of procuring numerous representations, or, to speak more correctly, *mis*-representations of their features at such a discount, I cannot say; but certainly out of a dozen there would be a *possibility* that one might still exist at the end of a week, which it is hardly likely would be the case if a less number were taken. As may be imagined, from the prices charged, the competition is very keen indeed; and I should not be at all surprised to see the imaginary placard of *Punch* realised, and an announcement to the effect that "a rasher of bacon and a portrait" might be had within for sixpence. The pertinacity with which these men insist on taking your portrait is only equalled by that of the proprietors of the bathing machines, who are so convinced that every man who walks on the sands in the early part of the morning requires a dip in the sea, that I have many times fancied myself in peril of being picked up, placed in a machine, and sent out to sea, and have with difficulty saved myself from such a fate by showing my dripping hair as a proof that I had just come out of it. They appear to entertain the same opinion of the veracity of the visitors as the clergyman did of his parishioners, who, taking for his text the words of David, "I said in my haste all men are liars," followed its enunciation by the meditative commentary—"Ay, David! you said that in haste, did you? If you had lived in this town you would have said it at your leisure." G. L.

MICROSCOPIC PHOTOGRAPHY.

Sept. 20*th*, 1858.

Sir,—I noticed in your first number of the "Photographic News" a communication respecting microscopic photography. The method I adopt for obtaining the same result rather differs from that there described; and as I have nowhere seen it mentioned, it may be useful to your readers if I do so.

I take the microscope, *without removing the eye pieces*, and fit a disc of cardboard round the tube, the outer edge of the disc also being made to *fit into my camera portrait lens.* Nothing now remains to be done but to adjust the microscope and camera (with lens) together, to focus on the ground glass, and substitute a prepared plate, developing in the usual way.

The light, I should have mentioned, may be obtained either from the mirror or condenser. By the above method, the necessity for pulling the two instruments to pieces is entirely avoided, and the object photographed may be increased to any size, only limited by the length of camera.

I am, sir, yours truly, C. B.

PRINTING IN CARBON.

Dorchester, September 18*th*, 1858.

Sir,—I have seen, and have to thank you for your notice of my discovery, and for the rectification of the error into which your French contemporary has fallen. It would serve me materially were there any means of inducing that journal also to take similar notice of the evident mistake in confounding mine and other processes.

I feel very much disposed to accede to your offer of testing the value of my discovery by the comparison of one of my *carbon impressions* with that of a *silver print* (here, allow me to ask you, if Mr. Fox Talbot's first or early prints, supposing some still existing, will bear comparison with photographs of the present day); and, notwithstanding that I had made up my mind, in consequence of what I considered as the unfair treatment of the Photographic Society, to avoid, for the present, any further discussion of the subject in London, it will afford me pleasure at once to send for your satisfaction (as I am confident the event will prove) a print of each kind from the same negative, that you may give your impartial and unbiassed verdict upon them; provided you will kindly undertake to authenticate both on the back by a private mark, which you can hereafter identify readily, and will return it to me on the completion of your investigation (say in a day or two). I fearlessly abide the result, knowing, that whatever improvements may hereafter be made, or whatever refinements some may consider my process requires, in comparison with others that have undergone fifteen years' experience, mine not having as many months, it is, at its present state of development, far more valuable than any that has preceded it. I am, sir, yours respectfully,

John Pouncy.

[It will afford us much pleasure to acquiesce in Mr. Pouncy's proposition. If he will forward us the prints, we will examine them, and at once give our readers a fair and impartial opinion as to their merits. We are fortunate enough to have one of Mr. Talbot's early prints, on plain salted paper, in our possession. It was taken, of course, from a paper negative fourteen or fifteen years ago, but we much doubt, if an unalbumenised paper positive were to be printed from the same negative to-morrow, whether any difference would be observed between the two. Some of the pictures in "The Pencil of Nature" will bear comparison with any modern prints.—Ed.]

Photographic Notes and Queries.

ECONOMISING WATER IN OUT-DOOR PHOTOGRAPHY.

September 14*th*, 1858.

DEAR SIR,—Will you kindly say, in your next issue, how I can do with the least possible quantity of water in out-door photography by the wet collodion process?

Yours, &c.,
A SUBSCRIBER AT NORWICH.

[This is a very important point for photographic tourists; for, if pictures of any size are attempted, and the whole operations of developing, fixing, and washing are to be performed on the spot, in a tent or *improvised* dark room, the amount of water required to be carried about is a serious addition to the weight of the necessary impedimenta of a travelling amateur photographer. Perhaps the following page from our own experience on this subject may be of use:—

We desired to obtain some small stereograms of scenery under circumstances which would render it necessary for us to carry the entire pack, camera, legs, tent, chemicals, and *water* ourselves; and, as it was clearly impossible to dispense with any of the former articles, we turned our attention to the water, and instituted a few experiments, with a view to ascertain how small a quantity would be necessary to use for each plate (the apparatus contained glass and chemicals for twelve pictures). Fixing and washing from the hypo. we soon found was out of the question—the amount of water necessary to take for that purpose being somewhere near a gallon; and as we had a decided objection to carrying about hypo at all, we tried whether the film could not be preserved from further change after the picture was developed. A very dilute solution of salt was prepared; and, as soon as the picture was developed, the pyrogallic solution was poured off, and the plate washed once or twice with the salt and water; it was then returned to the plate box, and after keeping for several hours in the dark, it was examined, and not the slightest deterioration could be detected. Upon pouring the fixing solution on, the picture was immediately cleared, and, when washed, the negative was undistinguishable from one which had been taken in the ordinary way. Weak salt and water answered very well for some time, and the quantity required was small enough to satisfy any one, not exceeding a pint for the twelve plates; but, in practice, a few objections arose from time to time which made it desirable to find out some substitute for the salt and water; the plates draining into the box soon contaminated the sides and grooves with salt, and this getting into the clean glasses dirtied them; moreover, whilst working in the almost air-tight tent out in the sun, with the thermometer at 130° inside, we often thought how nice it would be if we ourselves could, now and then, share the contents of the bottle with the developed picture. Pure water was next tried, and answered as well as the salt and water, without any of the drawbacks mentioned above; and, as we subsequently found, that a glass or two of sherry in a pint of water in no ways interfered with its photographic excellence—whilst it not only materially improved its quality as a beverage, but also caused the water to run more readily over the surface—we decided upon adopting the last-named mixture. The water was contained in an elastic india rubber bottle, into the mouth of which a narrow tube, with a very small orifice, might be adjusted, so that, whilst the water might easily be squeezed out in a thin stream on to the plate, upon removing the pressure, the elasticity of the bottle caused it to resume its proper shape, sucking the air in through this orifice. Whilst at work, the bottle might safely be laid down, and moved about any way without a drop of water being spilled, whilst for packing up, the tube could be pulled out and a cork introduced to make all secure.

The only drawback—and we wish some of our correspondents could suggest a remedy—is, that if many hours are suffered to elapse between this washing and the final fixing, the film seems, in some degree, to lose its adhesion to the glass, and thus, more than usual care is required in the fixing and subsequent washing, to prevent the film floating off; this, however, does not happen with those collodions which give a powdery film, owing to the pyroxyline having been prepared at a high temperature.]

BLACK AND WHITE POSITIVES ON ALBUMENISED PAPER.

Glasgow, 14*th September*, 1858.

SIR,—Your new work entitled the "PHOTOGRAPHIC NEWS" has induced me to write you on Albumen Positive Printing. I may premise I have been a reader of Notes and Queries, London and Liverpool Photographic Journals, Notes, &c. &c., from the first, and have endeavoured to pick up such formula as would, on albumenised paper, give me ebony black tone, but hitherto without success. I have got red, brown, purple, yellow, but never pure clean black. I confess to being a lover of positives on albumenised paper, and solicit your mature advice as to what additional step I should take to gain ebony black tones, with greater permanence.

I prepare and albumenise my own paper (using Canson and Marion's), with chloride of ammonium 10 grains, and then nitrate of silver 60 grains, with 2 drops of acetic acid to each ounce of solution. I print deep, and then immerse in pure water for five minutes, then in solution of strong hyposulphite of soda, with 15 grains of chloride of gold to the pint, adding (*per* Maxwell Lyte) 2 grains pyrogallic acid. I tone as deep as possible; finish in a fresh solution of hyposulphite of soda; wash for one hour in a running stream of water; immerse in a solution of soda, and two baths of warm water, then finish in a running bath of water for some hours, and then dry. What is superfluous; and what should I further do to gain my wished for colour, &c.?

In the *London Photographic Journal* for August 21st, 1855, page 210, I find M. Claudet gives a method for printing positives instantaneously by the bichloride of mercury, and developing with the protosulphate of iron. I have tried the plan, and occasionally get intense ebony black positives with 10 seconds' exposure. But this is not always the case; often the developing solution stains the front and back of pictures; other times the picture is gray, and the whites yellow. It was recommended to fix in the hyposulphite of soda, but this will not do, as the whole becomes a nasty yellow. This process, I do think, if properly carried out, would give pretty jet black pictures, but the want of chemical and photographic experience and knowledge prevents me knowing the errors in my way; your help is solicited. AN AMATEUR.

[We think your process could be improved in some respects, and the chance of obtaining the tone you desire much improved. In the first place, we think that there should be at least 30 grains of chloride of ammo-

nium, and 120 grains of nitrate of silver to the ounce respectively; this gives greater vigour, and also makes the paper more sensitive. Do not over-print much, and wash all the free nitrate of silver away, first in pure water, and lastly in weak salt and water, before fixing. Tone, *before* fixing, in a bath of 2 grains of chloride of gold to five ounces of water, and *soon after* the desired tint is obtained, transfer the print to a new hypo. bath of about 1 part to 3 of water; *but how long after*, experience in the lowering effect of the fixing bath will soon show. After being in the fixing bath for a quarter of an hour at least, remove, and wash in the manner you state above.

We can promise to those who follow this plan, if not absolute black and white, at all events a *very* near approach to it. Respecting M. Claudet's process with perchloride of mercury, we have had no experience of it, and would gladly receive information on the subject from any of our correspondents who may be wiser than ourselves.

ARRANGEMENT OF THE TELESCOPE, &c., FOR ASTRO-PHOTOGRAPHY.

September 16, 1858.

Dear Mr. Editor,—I am a young photographic tyro, and seeing you have devoted a space to the answers of those who may choose to refer to you for advice, will you be so good as to give us some *intelligible* method of arranging the telescope and camera for taking heavenly bodies; something in the able manner in which the article on the microscope is treated in the first number, and oblige

Your well-wisher,
P. F. P.

[We trust that the following extract from a paper which the editor read before the Royal Society, "On the Photography of the Moon," will give the desired information. In speaking of the Liverpool equatorial we wrote:—

"The polar axis and telescope together weigh about five tons, and whilst all parts are so truly and smoothly fitted that this enormous mass is moved equatorially by means of a small water-mill with such marvellous accuracy, that a star viewed through it appears absolutely stationary, its firmness is such that a hard blow against the side merely produces a scarcely perceptible momentary deflection. The object glass is 8 inches in diameter, and has a sidereal focus of 12·5 feet—the diameter of the moon's image in this focus being about 1·35 inches.

"The eye-piece was removed, and in its place the body of a small camera was attached, so that the moon's image would fall on the ground glass or sensitive film in the usual manner.

"The clockwork movement was only sufficient to follow the moon approximately when on the meridian, but as the pictures were nearly all taken when the moon was some distance past the meridian, and when consequently the declination and atmospheric refraction were changing rapidly, it was necessary, notwithstanding the short time required to take the pictures, to correct for the imperfect motion of the telescope. This was done by means of slow-motion screws attached to the right ascension and declination circles, which are each 4 feet in diameter. The *finder* had an eyepiece of a power of 200 applied to it, having cross wires in its focus.

"The *modus operandi* in taking the pictures was as follows:—The telescope having been moved until the moon's image was in the centre of the focussing glass, the water-mill was turned on, and the dark slide containing the sensitive collodion plate was substituted for the ground glass. Mr. Hartnup then took his station at the finder, and, with a tangent rod in each hand, by a steady and continuous movement, kept the point of intersection of the cross wires stationary on one spot of the moon's surface. When the motion was most perfectly neutralised, I uncovered the sensitive plate at a given signal and exposed it, counting the seconds by means of a loud ticking chronometer by my side. From the ease with which on my first attempt I could keep the cross wires in the finder fixed on one point of the moon by means of the tangent rods, I confidently believe that with the well-tutored hands and consummate skill which guided this noble instrument, the moon's image was as motionless on the collodion film as it could have been were it a terrestrial object."]

CONVERSION OF GLASS POSITIVES INTO NEGATIVES.

Ashton-under-Lyne, Lancashire.

Sir,—I should feel much obliged, through the medium of your "Photographic News," if you would give me your opinion on the system of converting glass positives into negatives by pouring on bichloride of mercury, and when well washed, pouring over hydrosulphuret of ammonia.

I have taken in the first number of your new "Photographic News," and find it very instructive. Hoping to see this answered under "Correspondents," I remain, sir,

Yours truly,
S. P. Q. R.

[We do not think the plan mentioned by our correspondent is worth much—it merely *darkens* the deposit as seen by reflected light, but does not much increase the opacity. The same may be said of the plan with chloride of gold. Far better is the method proposed by Maxwell Lyte, by whitening the picture in the usual way with the solution of perchloride of mercury in hydrochloric acid, and then, after well washing, pouring on a two-grain solution of iodide of potassium. The great advantage of this method is that it is *accumulative*, and by alternately treating the plate with these solutions any degree of intensity may be obtained. An equally good way is to re-develop the positive with the negative developing solution, after fixing in *cyanide* and well washing. In this way fresh particles of silver attach themselves to those originally precipitated, and an increase in density is the result. It must always be remembered, however, that no plan of increasing the opacity of a picture is of value when it has insufficient detail, and these processes obviously cannot *add* details of objects where none originally existed. All that can be done is to increase the opacity of what already is there, and thus it happens that photographers are so frequently disappointed in their attempts to convert positives into negatives; the requisite amount of detail being wanting, the result can only be a "soot-and-whitewash" negative.]

HIGHLY-GLAZED ALBUMENISED PAPER.—HOW TO MOUNT A PICTURE.

Wolverhampton, Sept. 16th, 1858.

Dear Sir,—Will you kindly oblige me with a few good hints on salting and albumenising paper, viz., the right sample of paper, with *quantity* and *description* of *chloride* best suited *to obtain violet tints?* I also desire a rather highly-glazed surface, which I have not yet been able to get by following the instructions laid down in Hardwich's formula. The glaze is only slightly perceptible even with a very small quantity of water to the albumen. What would be the result of floating twice, allowing the sheet to dry in the interval? I fix and tone in one bath of hypo. and gold.

Can you explain how it is, that when I come to mount my proof the gum sinks into the paper and completely spoils it? Can it be from too much washing, or is the fault in the paper?

Albumen.

[To obtain a highly-glazed albumenised surface on positive paper, it is necessary to use a *thin* sample of

paper (we have found some of Marion's make excellent), and also not to have *any* water in the albumen. Either chloride of sodium or chloride of ammonium may be used (for further directions to obtain dark prints, see answer to "Amateur"). If the picture be still not glossy enough, we should think that it might be re-albumenised with advantage, either before making sensitive, or after the picture is finished, in this latter case, however, it must subsequently be floated on weak alcohol and water (one part spirit to four of water), in order to coagulate the albumen.

The reason why the gum sinks through the proof in mounting is, that the size is removed from the paper during the washings. It can be resized by soaking in a hot solution of gelatine (about 40 grains to the ounce), and dried, if it be desired to use gum; but we should recommend the employment of starch paste, such as is employed for domestic purposes. This is by far the best cement for mounting photographs we have met with, and it has the further advantage of not requiring the picture to be sized, but it can be used at once. Apply it with a brush, and avoid, as much as possible, the presence of small gelatinous lumps of starch on the back of the picture when it is laid on the mounting card.]

IMPERFECTIONS IN TWIN STEREOSCOPIC NEGATIVES.

September 14, 1858.

Sir,—I use a stereoscopic camera with a double lens, but I find that very often I get one picture defective, whilst the other is clear and good, although I focus carefully, and attend especially to the light. Can you or any of your readers inform me whether this defect is often met with when two lenses are used, and whether I can remedy it?

I am, sir, yours obediently,

M. D.

[We have never met with defects of this description which were not clearly attributable to some faulty manipulation or similar cause. Care must be taken to make the developing solution run evenly over all parts of the plate, and it should be poured on and off in rapid succession towards the commencement, in order to mix it thoroughly with the nitrate of silver which it finds on the surface; otherwise, one half may be in reality brought out with a far more energetic developing solution than the rest of the plate. Another possible cause of dissimilarity between the two halves might ~~be in~~ the lenses, for if not made expressly to mark with each other, their focus might be different, or one might require longer time than the other, owing to a slight yellow tint in the glass. Lenses to be used in a twin camera should always be made and tested for this special purpose.

We will see if your suggestion can be adopted. When you say an "apparatus for micro-photography," do you mean an arrangement for obtaining enlarged or reduced photographs of bodies?]

GLYCYRRHIZINE IN THE COLLODION OR BATH.

15th September, 1858.

Mr. Editor,—Will you be good enough in your next journal to say if glycyrrhizine is still used for increasing the sensitiveness and intensity of negatives (I suppose it is preferable in the bath than in the collodion), or if not now used, what are the objections to it?

Yours most truly,

G. B.

[Glycyrrhizine is still used by some photographers, although not to the same extent as formerly. It is generally added to the collodion. If added *rashly* by a person inexperienced in its properties, it has great tendency to produce negatives of excessive density and hardness, and we believe that that is the general complaint about it. Some kinds of collodion also give sufficiently dense pictures without it, and those kinds which do not require it at first, frequently acquire density in keeping; and thus, even with its greatest admirers, glycyrrhizine is only of occasional assistance; but in some cases we must admit that it is of great service, and might be employed with advantage more frequently, if photographers would take the pains to study and understand its action.

For our own part we prefer it in the bath, and a reference to part of the article on ACCELERATING AGENTS, which will appear in our next week's *Dictionary*, will give some useful information.

ANSWERS TO MINOR QUERIES.

White Positives on Glass.—*Excelsior.*—*C. E.*—

Rectified ether, sp. gr. ·720	... ...	5 drachms
Alcohol sp. gr. ·825	... ...	3 "
Pyroxyline	... ...	5 grains.
Bromide of cadmium	... ...	2 "
Chloride of cadmium	... ...	1 "
Iodide of potassium	... ...	2 "

The above formula, in addition to the information given in No. 1, p. 12, will enable you to take good positives.

Spots on Collodion Positives.—*J. W. C.* sends a positive collodion portrait, which, on viewing by transmitted light, appears covered with a multitude of very small opaque spots. We have met with similar annoying visitors in our own practice. Frequently they are caused by the collodion having been used too soon after mixing; the addition of the alcoholic solution of iodide of potassium to the ether sometimes precipitates a little of the iodide of potassium in the form of a fine white powder, and if the collodion be used before that has entirely settled, spots are sure to make their appearance on the film. The remedy is obvious; either employ a weaker solution of iodide of potassium, or iodise with a cadmium or ammonium salt. A similar effect is sometimes produced in a curious state of the bath:—the pictures are in other respects as good as could be desired, but, on examining either the interior of the sides of the bath, the dipper, or the surface of the collodion plate as it comes from the bath, thousands of minute hair-like crystals may be seen. We have hitherto entirely failed in finding a remedy, except by the use of fresh materials; we suspect that the crystals are either *nitrite* of silver, caused by the nitrate having been fused at too high a temperature, or *oxalate* of silver, arising from a minute quantity of oxalic acid being introduced into the collodion with the pyroxyline; this acid being frequently produced, even in rather large quantities, if the temperature of the acids be too high during the preparation of the pyroxyline.

Removing the Black Varnish from Glass Positives.—*Photographer* asks how to remove the black varnish from the back of a glass positive, as he wishes to use it as a negative, and take a paper copy from it. The positive must be laid face downwards in a dish, and then turpentine must be covered over it; when the varnish is partially softened and dissolved, fresh turpentine must be added, and so on until all the black varnish is removed. It will be a tedious job, as no friction must be used, and the greatest care will be necessary, or the film will be loosened, and the picture be destroyed. We are here supposing that the black varnish employed is the ordinary one soluble in turpentine; if it be insoluble, however, other solvents, such as alcohol or benzol, must be tried. We give the above information as desired; but at the same time do not think that it will answer the purpose our correspondent wants it for. The appearance of a good positive when looked through is so faint, and the density of even the highest lights is so inconsiderable, that we doubt if it could be used as a negative from which to print anything like a satisfactory picture.

Transparent Spots in Collodion Positives.—*One among the Many* complains of a number of transparent spots, about the size of a small pin's head, appearing in the whites of positive pictures about a week after they are finished, the same, not being varnished. The most likely cause for such an occurrence would be insufficient washing after fixing in hypo. or cyanide; the former especially would be apt to form such marks, and destroy the picture.

Ammonia in the Bath.—*In a Fix* has been neutralising the acid in his bath with ammonia; the red litmus paper changes colour a little, so does the blue. When a picture is taken the plate turns black all over on developing, and gives no trace of the subject. Our correspondent has evidently mistaken the alteration in colour which blue litmus paper assumes when *wetted*, for an indication of slight acid reaction. The bath, in reality, is alkaline, and, to correct it, a trace of either acetic or nitric acid must be used. Ammonia should not have been used in the first instance. Carbonate of soda is the best alkali to add to a too acid bath.

Film over Positive Pictures.—*Nil Desperandum* has taken several pictures on enammelled iron tablets, which, when dried, appeared coated with a light blue haze over the before perfect picture, rendering it indistinct. When immersed in water the film disappears, and the picture looks clear again. We do not know the cause of the phenomenon, except that we think it depends in a great measure on the state of the pyroxyline in the collodion. It may be remedied by holding before a fire until the tablet is too hot to touch; the haze then disappears, and leaves the picture perfect. Varnishing afterwards is an improvement, although not absolutely necessary.

No Eyes!—*Focus* has built a new glass room, and has had some palings near his dark room tarred, and since that occurrence every picture has *no eyes*. Do we think the smell of the tar extracts any properties from the bath, or interferes with the development? We think that the smell of tar, unless so strong as to be absolutely unbearable, would be of no effect in the process. The most likely reason for such a physiological phenomenon is, that in removing to a new glassroom proper attention has not been paid to the direction whence the light falls, which, entering the lens, produces a misty appearance. Lay a board the width of the camera along the top of the camera, projecting over the lens as far as possible without cutting off any of the field, and over this throw a piece of black cloth; this will doubtless prove an antidote to this ophthalmic effect.

Vignette Positives on Glass.—*Chemicus* asks how the peculiar halo or vignette appearance is given to positives. A very pretty vignette effect may be produced in the following manner:—Cut out of a large piece of black card a hole of the desired *shape* for the vignette, and a trifle larger in diameter than the full aperture of the lens. Place this on a stand or foot, so that it is exactly the same height as the lens; then, having arranged the sitter and focused properly, place the *hole* at such distance in front of the lens, that on looking at the ground glass the picture presents the required vignette appearance, remembering, that the nearer the card is to the sitter, the larger will be the space in the picture contained in the vignette. If it be desired that the vignette picture should vanish in a white halo, the card should be *white* and well illuminated; whilst, if the picture be required to vanish into a black ground, the card must be black, and the greatest care should be taken to keep all light away from it.

Reimmersion of the Plate before Developing.—*F. S. L.* asks whether it is injurious to dip the plate into the bath after exposure in the camera, as he finds with large plates it helps the developing solution to flow more evenly. With *some* collodions a reimmersion in this way would tend to give a foggy picture, but we have not usually found this to be the case, and decidedly are in favour of using a sample of collodion which will admit of such a proceeding. Reimmersion is a very great assistance in many respects, as it not only helps in the more even flow of the developing solution, but when the exposure has been protracted for ten minutes or more, it would be nearly impossible otherwise to cover the plate at once with the developer, and it also removes any little particles of dust which may have settled on the surface, which would form centres of irregular action (or solid nuclei of long tailed comets, as the papers would say). Redipping also thoroughly moistens the film all over, and makes the upper part, which has nearly or quite dried, equal in its development with the lower, moist part.

Granular Appearance in Albumenised Paper Positives.—*C. B.* asks how to prevent paper positives (both plain, salted, and albumenised) from becoming speckled and yellow, and incloses two specimens. A similar effect is produced when the positive is removed too soon from the hypo. bath, when removed too soon from the washing water after fixing, or when the fixing bath is too weak, or has been in use too long. No remedy is known. It may be prevented, however, in the following way:—employ a new (or nearly so) fixing bath of a not less strength than 2 ounces to the pint, wash the prints in water before fixing, and then keep them in the hypo. for at least a quarter of an hour. When fixed, wash in a large dish of cold water for forty-eight hours, changing the water every eight hours, then give them one or two short washes in hot water, and dry. If required to be coloured, it should be done before fixing. See second answer to *J. B.*

Varnish for Negatives.—*Veritas.*—We use a colourless spirit varnish imported from France, which is applied with heat; but we confess ignorance as to its composition, and should feel obliged if some reader cleverer than ourselves would enlighten us. See answer to "Bungler," vol. i., p. 24.

Leather for Collodion Positives.—*Amateur* asks what kind of leather is used for taking portraits on. The kind known under the name of "Patent Calf" is the best for this purpose; it can be obtained at any leather warehouse. 2. Brunswick black. 3. Whichever you like; the terms are used indiscriminately.

TO CORRESPONDENTS.

W. H. H.—Collodion will lose its fluidity when kept, owing to the evaporation of ether. Cadmium collodion also becomes glutinous when kept even closely stoppered. The reason is supposed to be a reaction of the metallic salt on the pyroxyline, but very little is known about it. The addition of iodide of potassium to the iodising compound will prevent such an occurrence.

R. B.—Most of the elementary works on photography would contain the information you desire. Our catechism, we should think, would be your best guide.

An Amateur.—1. Citrate of the protoxide of iron. 2. Either equal parts, or a saturated solution. 3. The authors stated so. 4. Floating will do. 5. Amber varnish would not do so well as a spirit varnish.

J. B.—The *chemical* part of the process for taking pictures by gaslight is the same as for daylight, but, of course, the *mechanical* arrangements must be different. 2. See answer to S. P. Q. R. 3. Stereoscopic pictures may easily be taken with a common camera. The two positions for the camera must first be decided upon, and then a picture taken from each position. These two will then be stereoscopic if printed from and mounted properly. The objection to this mode of working is, that the object is liable to move in the interval of time elapsing between the two exposures.

Enquirer.—F. C. S. means Fellow of the Chemical Society.

W. D.—Iodide of ammonium.

T. T.—The desired information will appear very shortly in the "Catechism." In the meantime see answer to E. B. G., vol. i., p. 23. Yes. Will our correspondent kindly favour us with the names of one or two persons in his town, who would be likely to undertake the agency of the "News?"

M. H.—We do not think you can do any good with either collodion; try how they work after mixing them together, and allowing them to stand for twenty-four hours.

S. K. W.—See answer to "Nil Desperandum."

G. D. S.—A. S. L.—K. V.—Anthony.—See answer to S. P. Q. R.

E. C.—G.—Subscriber.—F. C.—An Amateur.—Cornish.—F. L. B.—Our correspondents will see that it is out of our power to save them the trouble which is indispensable in mastering the principles of any science.

Received:—Subscriber—J. H.—W. D.—W. M.—J. W.—J. P. G. J. W.—J. B. P.—J. C. S.—J. W. N.—G. M. F.—J. W.—Earnest—T. S.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, addressed to the office, should, in all cases, be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 4.—*October* 1, 1858.

APPROACHING PHOTOGRAPHIC EXHIBITIONS.

IN January next an Exhibition of the Photographic Society will be held in the Old Water Colour Society's Rooms, Pall Mall East, which we have no doubt will be highly successful, as that is a locality which is easily accessible, not only to photographers, but also to those who take an interest in photographic progress. And again, the facilities for hanging, and the good arrangement of light will conduce materially to the success of the intended exhibition. The Council of the Society have passed a resolution which has not only astonished us, but many others. We have received several communications on the subject, but, as our space is very valuable, we do not feel justified in giving anything more than a general notification of the fact, because we are sure that if the Council will only reconsider the subject, they will see that there has been a degree of precipitancy in passing the resolution which will not stand the test of deliberation.

The resolution is to the following effect:—"That no photographs will be admitted that have been exposed in shop windows, or otherwise publicly exhibited in this country." As we have said, we have received remonstrances on the subject, and we perceive that dissatisfaction is expressed in other quarters. The resolution can excite but one feeling, that of disapproval. It seems to us to be a most effective attempt to defeat the object of exhibitions, because it will easily be seen that to exclude a photograph from an exhibition, simply because it has been exhibited in the shop windows, is a most arbitrary regulation, since many of our leading photographers have their respective publishers, and it is not likely that a publisher would so far forget his own interest as to withhold the publication of a photograph until it had been exhibited at the Society's exhibition. Take an instance.—There have been a series of photographs of Cherbourg recently published, giving views not only of the fortifications, but also of the combined fleets of England and France. Now it is very certain that to prohibit the exhibition of these would be to lose the sale of them, because the interest attaching to them, as far as regards the public, is transitory; but some of them, as photographs, would be interesting to the visitor of a photographic exhibition. It is clear that such a resolution cannot but have a bad influence upon exhibitors, more especially upon those photographers who publish annually. If the resolution means anything, it means that it will be strictly adhered to; but, to put all doubt upon the matter out of the question, we have it upon official authority, that "this resolution will of course be strictly carried out by those who receive the photographic works and arrange them on the walls." Yet, on the same authority, we are informed that the "resolution is not intended to exclude the works of our photographic brethren exhibited at the exhibition in Edinburgh." Now, unless political or geographical changes have taken place of which we are not cognizant, we believe that our brethren on the north side of the Tweed belong to "this country." Altogether there is a vagueness in the resolution which will preclude the possibility of carrying it out. How are the hanging committee, which is generally composed of metropolitan members of the Society, to know what has been exhibited in Dublin, Leeds, York, Edinburgh, Glasgow. And again, are there not many who annually make the Photographic Society's Exhibition the object of a journey to London? and it cannot be expected that they can have seen what has been exhibited in the shops of London any more than the Londoner can have seen what has been exhibited in provincial shop windows. There is always, in connection with photographic views, a local interest which requires that they should be exhibited in the localities in which they are taken, in order to repay the trouble and expense attendant upon their production. But how unjust to exclude them from the benefit of metropolitan exhibition. If the Council are determined to have a resolution passed to prevent that re-exhibition of pictures which has so marked the last one in Coventry Street, let them pass a resolution to the following effect:—"That no photographs will be admitted that have been exhibited at previous exhibitions."

We have been kindly informed by a correspondent that, judging from present appearances, there is every likelihood of a very good collection being formed at Edinburgh. The exhibition opens in December; and a new feature has been introduced by the managers of the exhibition in the shape of prize medals. It is intended that they shall be of two classes. The one for the best photograph produced by a member of their own Society, the other to be given to the photographer of the best picture, he not being a member, but an exhibitor. We are of opinion that this cannot in any way benefit the cause of photography. As all our readers know, there is no need of such a stimulant to exertion. There is too much friendly rivalry in the ranks of photography to need the bait of a silver medal. We all know that every photographer endeavours to produce the best picture he can, hence the thousands upon thousands of attempts which are daily and hourly being made in order to improve upon past successes. Again, it must be a matter of considerable difficulty to decide what constitutes the best picture, seeing that photography can be applied to so many things. For instance, here are some of the difficulties which arise in our mind. Will the prize be given for the best landscape, the best portrait, or the best copy of a picture? All these branches are very important in their way, and to each ought a medal to be awarded. Some people admire nothing in photography but landscapes; others, picture copies; and a very large section of those in-

terested in photographic matters, portraits. So that here will be the introduction of an apple of discord, and whatever direction the wisdom of the adjudicators may take, it is certain that a great number will be dissatisfied. However, we must await the result of this new experiment to see if our forebodings will be borne out by actual experience.

ON THE CALOTYPE PROCESS.

EACH negative process possesses advantages which it is utterly impossible to combine, and for this reason only, men never can agree as to the *best* method of getting a negative. For architecture, and indeed almost any class of subjects except statuary, paper gives results fine enough to satisfy a very fastidious taste; and in truth, for boldness and large pictures, glass gives no better results than this. Mudd's "wax-paper" rocks, old cottages, &c., and Turner's "calotype" old oaks, &c., equal anything of the same size that we meet with, whether glass or paper. Again, for a fortnight's trip, dry plates are perhaps the most convenient, having the advantages of great certainty; no need of development until our journey is finished; and good for any subject, statuary, water, or landscape;—but, for a six weeks' trip this process would be very inconvenient on account of the weight of such a quantity of plates (especially if large ones), the uncertainty of their keeping so long, and the trouble of packing so many. Wet collodion, with its tents, &c., makes quite a load for a horse, and in some places it would be impossible to transport it. Paper alone is left to a man in these cases, and his choice lies betwixt wax-paper and calotype. Perhaps for boldness and sharpness the latter is the better of the two, but in point of cheapness it is infinitely preferable, and certainly it is less difficult (*i. e.*, as far as I can judge, and I know both) to a beginner. One difficulty alone there is in it, and that is our first consideration; viz.,—

THE PAPER.—Of all the papers which I have worked, none give as fine results as the old "Turner's." Its even, close grain had almost the uniformity of glass, and its dense skies needed no stopping out: but after a time this make of paper grew less uniform, and became also spotted all over in the process of bringing out the picture, owing to there being small portions of iron in its texture, which unfitted it for this process. Whatman's, or Hollingsworth's as it is now called, is perfectly free from all impurities, works beautifully white and clean, and, indeed, would be the perfection of calotype paper but for the one defect—the want of density in the blacks; this fault cannot be remedied by any care, and we must either rest content with a *dirty* sky, or fill it out, which is sometimes impossible. The French paper is utterly useless for this purpose, and no amateur need make the experiment and waste his time. From what I have heard, I should almost advise a beginner to work a few sheets of Turner's, procured at any trustworthy dealer's. When the paper is cut to the size of the dark slide, the second thing is

TO IODISE.—Take any quantity of distilled water, and to each ounce add 15 grains of nitrate of silver. In another vessel put the same quantity of distilled water, adding 15 grains of iodide of potassium; dissolve, then pour the solutions together, and a yellow precipitate of iodide of silver will be formed, and will sink to the bottom; pour off the liquid, but be careful that none of the precipitate is lost; add 3 or 4 ounces of rain or distilled water; stir with glass rod; let it remain to settle; pour off, and repeat this washing. The reason of this washing may appear intricate to the beginner, but the separation of the iodine from the iodide of potassium, which leaves the latter to go to the silver, and form iodide of silver, causes the nitric acid to be free to unite with the potassium, and to form nitrate of potassium, which latter, being *soluble* in water, whilst the iodide of silver is *insoluble*, is washed away, or nearly so, in these changes of water. When it is well washed, pour off, carefully as before, as much water as possible, and then, to the precipitate from the above-mentioned 15 grain solutions, add 140 grains iodide of potassium, and fill up with distilled water to make one ounce; probably these 140 grains will not cause all the *precipitate* to dissolve; in which case, add a few grains at a time until the whole of the iodide of silver is dissolved, and the solution becomes quite clear. This is called the double solution of iodide of potassium and silver, and must be applied to the papers cut to the size of the dark frame. To apply it some use the glass dish and float, others the glass rod, but I think the brush made for photographic purposes is more convenient and less troublesome. Lay the paper on a piece or two of blotting paper, and brush the solution well over it, first *along* and then *across* the sheet, and hang it up to get dry, or nearly so. A man may readily brush over thirty or more in an hour; and as (when well washed) they will keep any length of time, or, to speak more truly, improve with keeping, one need not fear doing too many. When the sheets are dry, or approaching dryness, place them in some large vessel of water to wash out the superfluous iodide of potassium which was used to dissolve the iodide of silver in the first preparation. To do this effectually the sheets must be moved about, and the water changed twice or thrice, until each piece is of a deep primrose colour; some papers require three hours only, none should be washed less, some four or five, and I have met with one paper which had to be washed for six or seven. If in the finished negative there are white patches, it arises either from the potassa salt not being washed out, or from the liquid not being spread over the whole surface of the paper. I always deem the well washing of the negative sheets one of the most necessary points in this process. I am even careful to wash the yellow sheets in clean water before hanging them up to dry. In this stage light does no injury, however strong; indeed, it does them good to place them in strong sunshine.

(To be continued.)

NOTES FOR ALPINE PHOTOGRAPHERS.

Lausanne, Switzerland, Sept. 16.

DEAR SIR,—Perhaps a short gossipping account of a pedestrian tour lately made by myself and a friend to the valley of Zermatt and Aosta may not be uninteresting to some of your readers. Being amateur photographers, we determined to try how far we could

prosecute our favourite art on such an excursion without bothering ourselves with too much "impedimenta." Photography was only a secondary affair; a fact necessary to be borne in mind. But we kept our photographic eye open throughout our tour, and perhaps a note or two as to what we saw worthy of the photographer's attention may prove useful to some of our brethren of the camera intending a similar excursion next season.

Although I had had very little practice in any of the dry or preservative processes, and that practice had not particularly prepossessed me in favour of any of them, I determined to try the oxymel process of Mr. Lewellyn, which seemed to me to offer the greatest facility in preparation, and the greatest probabilities of success in the result. This determination I came to in order to avoid the disagreeable necessity of developing my negatives "*en route*" at night in a strange place, and after a hard day's walk, when sleep is absolutely necessary. Now the plates (stereoscopic) so prepared were all successful as far as exposure, development, and intensity were concerned; *but* (how often has the poor amateur thus to qualify his most successful results!) a mishap befel them, which rendered all more or less worthless for printing purposes. Not possessing a box for holding glass plates, I borrowed one from a friend. This box was made of tin, with internal grooves as usual, but, unfortunately, the interior is blackened with a very coarse lampblack, mixed with some vehicle, and smells like the strongest soot from an ordinary coal fire. Although I took the precaution of placing some *papier Joseph* on the top of the plates to prevent their shaking about, I found the plates, when I took them out in order to develop them, covered over with little black atoms from the lampblack, which it was impossible to get rid of by washing, and which bespangled the developed plates with spots, stars, and comets, according to the shape and size of the particles deposited. I inclose a print, a bit of the Görner glacier, which runs into the valley of Zermatt. Here you can stand on the green grass and touch the glacier with your hand at the same time. The negative was developed some ten or twelve days after exposure. Had all the plates been as free from spots as that, I should have esteemed them worth preserving as mementoes of places I may not have an opportunity of revisiting. My misfortune, or, as some may think it, my want of foresight, may prove a useful caution to beginners not to employ similarly blackened boxes for holding their oxymel plates.

With the print of the glacier I send you another taken by me last week on a plate prepared according to the novel formula about which I wrote to you. The plate had been sensitised a week; exposure, 3½ minutes. If you think the result tolerable, I shall be happy to give you more particulars concerning the process.

In addition to these oxymel plates, I took with me a few plates prepared most carefully according to Dr. H. Norris's plan. I presume my collodion was not adapted for the process, for I got no good results. The same collodion which gave good negatives with four or five minutes' exposure, when employing oxymel, afforded but a faint positive when employing Norris's formula; and I am convinced, from a number of experiments carefully made since my return home, that the oxymel or syrup processes are the easiest, and by far the most certain of all the preservative processes. To do anything at all with gelatine, it is necessary to have a sample of pyroxyline made by a very experienced hand, and even then the preparation of the plates is much more difficult and tedious, the exposure very long, and the results, in my opinion, no better. In the last number of one of your contemporaries there is a paper by Mr. Lewellyn on a modified oxymel process, which will be found most excellent, although it is diametrically opposed in theory and practice to the opinions of Dr. H. Norris and others. Mr. Lewellyn would add to our many obligations to him if he would tell us exactly what formula for the silver bath he uses, and whether he manufactures his own collodion, or whether he employs, as I have been told he does, that made by Ponting. While the English photographic authorities inculcate the necessity of having a bath slightly acid, the French and other continental authorities, Davanne, Monkhoven, &c., as strongly insist upon a neutral one, nay, even one with a slightly alkaline reaction. I have been trying lately, side by side, a neutral and an acid one, both for wet and dry collodion. The films sensitised in either bath are equally free from fog, but the neutral bath gives far greater rapidity and density of image. I have employed distilled water and rainwater for the bath, without any perceptible difference in the results. But this is a long digression from our road to Zermatt. S.

(*To be continued.*)

[Our correspondent has forwarded us two very beautiful pictures; they each speak volumes for the excellence of the processes by which they were taken. The one of the glacier has a few "comets" in one corner; but they are evidently owing to the unphilosophical manner in which the maker of the tin box had tried to make it further opaque. Besides, comets at this present season are objects of great interest. We shall be glad to receive a full account of the novel mode by which the second named plate was prepared, as also the continuation of the present article, which we are sure will be read with great interest.]

New Discoveries.

On Copies of Designs produced by the Adherence of the Vapours of Phosphorus, Sulphur, Chlorine, and Sulphuretted Hydrogen. *By M. A. B.*

One of the professors of the Technological University of Florence, M.A.B., made in July last, and published in the last number of the *Nuovo Cimento*, some interesting experiments on the mode of reproducing engravings and designs by means of vapours of different substances, described by M. Niépce de St. Victor in his paper of March last. We give a hasty analysis of this interesting communication.

A design exposed for a certain time to the vapours of phosphorus reproduces itself when brought in contact with paper prepared with chloride of silver. The vapours condensed upon the outlines of the design, and not on the ground, decompose the salt of silver, and produce faint lines which represent the blacks of the design. To obtain a good reproduction, it is necessary that the design should remain exposed to the action of the phosphorus about three-quarters of an hour, and remain in contact with the sensitive paper for twenty minutes. The chloride of silver not decomposed is dissolved by placing the paper on the hyposulphite of soda, and afterwards washing it in pure water. The proof thus

obtained is faithful, but it is not an artistic proof, and the original design is always destroyed or spotted.

A design can be reproduced by exposing it for some moments to the vapour of iodine, and pressing it against a paper sized with starch, and glazed like ordinary letter paper. A single exposure to the vapour of iodine may give several copies, but they become effaced in time, and the original is always a little damaged.

One may operate in the same manner with the vapours of sulphur, sulphuretted hydrogen, and chlorine. In the case of the two first named vapours, the paper is prepared with the chloride of silver. In the case of chlorine, a sheet of paper sized with starch, and soaked in a solution of iodide of potassium, on coming in contact with the chlorine, has its iodide decomposed; the liberated iodine colours the starch a sky-blue, which designs the blacks of the engraving.

What are the essential elements of the reproduction? What are the agents which modify them? It was quite natural to think at first of the chemical action, and to assure ourselves if it really works. In fact, the condensation of the vapours is always greater where there is the greatest affinity between the vapours and the substance with which the outlines of the design are found. Among the numerous experiments which demonstrate this truth, it will suffice to cite the following facts:—In exposing to the phosphorus the designs made with different substances, the greatest intensity of action has always been obtained when the substance employed was oily or fatty matters in which, as is known, phosphorus dissolves. Thus engravings printed in printer's ink reproduce themselves much more quickly when the ink is fresh than when it is dry or old, and very much more quickly than if the design had been traced with common ink. Figures traced upon paper with alcohol which were allowed to dry until they became invisible, reproduced themselves perfectly upon starched paper after exposure to the vapours of iodine. The reproduction is much feebler when water is substituted for the alcohol; it is well-known, indeed, that iodine, which is very soluble in alcohol, is almost insoluble in water.

Chemical action therefore intervenes in the phenomenon, but it is not the essential or unique cause. The greater or less degree of polish of the surface exposed to the vapours, for example, has a much greater influence. Two papers were exposed at the same time, the one glazed, the other not, and a condensation was produced which was evidently much greater upon the second than upon the first. A fretted paper, imitating the skin, similar to that used by bookbinders, reproduced the asperities in more sombre outlines than the ground. The borders of the paper exposed to any vapours whatever, especially if they are chafed, reproduce themselves in much deeper tints than the rest, and thus show that they are more charged with vapours. These last facts lead to the supposition that any mechanical action exercised on the surface of the paper would determine an unequal condensation of the vapours to which it might be exposed. Now, experience has proved that a design made upon paper by rubbing it so lightly with a point that the outlines were not visible to the eye, showed itself distinctly as soon as the paper was exposed to the vapours of iodine. . . . To render the appearance of the design much more distinct, it is advisable to operate upon paper sized with starch and glazed, to expose it to the vapours of iodine, and then to plunge it in water; the design then shows itself of a beautiful azure blue upon a much clearer ground.

By pressing upon a sheet of paper a seal or a plate of engraved copper, and afterwards exposing the paper to the vapour of iodine, the outlines are seen to appear, even when the paper is washed after the action of the point or of the seal pressed against it, and dried before exposure to the vapours of iodine. A plate of well-polished glass presents the same phenomenon, but in a much feebler degree, and if we operate by pressure, this pressure must be much stronger.

All these experiments and many others lead to the conclusion that the cause of the fact announced by M. Niepce de St. Victor, is the mechanical alteration that the sheet of paper undergoes in certain points, and that this principal cause is in many cases modified by the chemical action which operates between the vapours and the substance of which the design is composed. It will be true, in general, that each time that a surface has undergone a mechanical action of any kind in some of its parts, it acquires on these parts the property of condensing all the vapours that fall upon it, and combining with them in a special manner. We have recourse in this way to a rather similar theory to that by which the images of Möser have been explained, which were probably traced by a condensed vapour, after a mechanical or physical action had modified upon some points the molecular condition of the surface. The images obtained by M. Karsten upon plates of glass or metal by means of electrical discharges, and which became visible by exposure to any vapour whatever, prove that electricity is apt to produce the molecular alteration which afterwards determines the condensation of the vapours, unless one prefers to admit that the electricity alters the veil of vapour of water which naturally covers the surface of the body acted upon by it.

Are light and heat able to produce analogous effects? M. A. B. has made some experiments with a view to answer these questions, but they have not led to any conclusive result; the only fact very clearly observed is the following: a white paper placed in the focus of a lens exposed to the solar rays, and left to itself for a certain time afterwards to re-establish the equilibrium of the temperature, and then exposed to the vapours of the iodine, has presented a white spot at the point which corresponded to the focus; which proves that at this point the condensation of the vapour was less than elsewhere. Others will find perhaps better means of evidencing the action of light and heat.

In conclusion, everything induces us to believe that the different phenomena like those pointed out by MM. Niepce, Möser, Karsten, have their common origin in the molecular alteration produced, on certain points of the surface of a body, by a change of position that some molecules have undergone; this displacement, this new state of equilibrium, may afterwards become in its time the cause of the unequal condensations of vapour. The laws which govern these different attractive actions remain hidden like all the laws of molecular mechanics.—*Cosmos.*

Critical Notices.

THE PHOTOGRAPHIC EXHIBITION AT THE CRYSTAL PALACE.

SECOND NOTICE.

There is here an almost utter absence of compositive photography, except in the productions of Mr. Robinson, of Leamington, which almost reconcile us to the principle which we believe scarcely applicable to photography. But we will not now enter into the question, as it would be foreign to our purpose, and would require more space than we have at command, but at some future time we may take the subject up, as much on account of its applicability, its utility, and the general considerations which may be urged in favour of its use, as of what may be said against it. We have no objection to single or even double figure subjects, which can be taken in one sitting; what we most object to is the patching process. The photograph, "Fading away," is an exquisite picture of a painful subject. There is such an amount of true feeling in it, that we cannot help giving it a lengthy notice. The picture is treated in the following manner, and is an exemplification of these beautiful lines by the poet Shelley:—

> "Must, then, that peerless form
> Which love and admiration cannot view
> Without a beating heart; those azure veins,
> Which steal like streams along a field of snow
> That lovely outline, which is fair
> As breathing marble, perish?"

In the centre is a beautiful girl, on whose countenance is evidently written her doom; wan and wasted, she reclines on an impromptu bed, behind which stands her sister, sorrowfully musing, and immediately facing the sister is the tender mother, who gazes on the wasted form of her child with great maternal anxiety. On her knee is the Bible, which she has just been reading, and at the window stands the lover of the sick girl.—He with melancholy pensiveness is watching, from the window, the setting sun, which, to his eye, is evidently a type of her, who, for him, is no less surely "fading away." It seems almost incredible that such a difficult subject could be so beautifully treated by a merely mechanical process. But the great success which attends Mr. Robinson's efforts is owing to his being so ably seconded by a young lady, who, to say the least of it, is thoroughly able to appreciate and enter into the feeling of the poetry or sentiment which it is his object to elucidate. Be the character what it may, she thoroughly understands her part, and, with an art peculiarly her own, she makes the picture something extraordinary. In this instance we are utterly unable to understand how she can enter into the subject in a manner so *con amore*, because, of all characters that of a sick person is the most difficult to delineate. Even on the stage, assisted by all the trickery of the profession, a correct representation of the character is a triumph of artistic skill; but when we come to photography, which would expose anything like extraneous superfluousness, it is really astonishing. That there are defects in the picture we do not deny; there are many; but these, we apprehend, are not attributable to any fault of the composer, but are inseparable from the means by which the picture is obtained. For the size of the picture there is decidedly too much drapery on either side of the windows, while the arrangement of one or two things is slightly out of drawing. But probably these are things which may be obviated in future attempts. Then, again, though the secondary figures which are necessary to form the picture are good, and are equal to the average run of good photographic models, yet the difference between *the model*—the gem of models—and the others, is painfully perceptible. For instance, the figure which represents the sister fails to give that true expression which is requisite for the part assigned her. She enters but partially into the feeling of the subject, and the expression is consequently forced; hence, instead of a countenance portraying melancholy feelings, we have one of blank musing, not quite in keeping with the rest of the picture; while the lady who plays the part of mother, does it so well that one cannot help being struck with the truly maternal expression of her face. There is all that solicitude which motherly instincts prompt—that loving gaze which the mother bestows on her favourite sick one. The male figure is well placed, and although the beholder only sees his back, there is in the attitude a pensiveness which at once tells its own story. We wish Mr. Robinson every success in that peculiar and difficult branch of the art; and if it is to be recognised as the artistic department of photography, let us at least have men who can do the proper thing, and in the proper manner. This picture gives a good idea of Mr. Robinson's capabilities, and we must really warn Mr. O. G. Rejlander to look to his laurels. There are one or two other pictures in which we again have the favourite model. The first is a small picture entitled "I know." There is a girl walking along in a thoughtful mood, dressed with scrupulous care in the country fashion—in fact, the costume partakes of the antique, and it would require but little stretch of the fancy, to imagine that she was the "Evangeline" of Longfellow—by her side is a smiling, wicked-looking little lass, who evidently is in the secret as to the cause of all this melancholia, undoubtedly the result of a love affair, and the picture represents the time when the mischievous little teaze is rallying her friend, and is with a chuckle uttering the words "I know." This is the only attempt we have seen at humour on the part of Mr. Robinson, and he has the advantage over other compositive photographers, that he carefully excludes what is vulgar, and knows where to stop. There is also another picture in which there is a girl dying (our favourite being again the model), represented with such statue-like fidelity, that our admiration is divided between it and "Fading away." The drapery in this study is something marvellous; every fold is so carefully placed, that were it a copy from a marble statue, there could not be greater precision and accuracy displayed. Underneath this picture are the following lines:—

> . . . . "She never told her love;
> But let concealment, like a worm i' the bud,
> Feed on her damask cheek."

Admirably does the face of the model portray the feeling of secret love. There is such a gentle loveableness, and, at the same time, such an unmurmuring resignation, that were this figure painted on canvas or sculptured in marble, great praise would be due to the artist who could so idealise the poet's description. How much greater, then, is the praise due to the artist who has borrowed the expression from a living model! There are some smaller but less pretending pictures here by Mr. Robinson, evidently impersonations of "Little Red Riding Hood," whose adventures with the ravenous wolf have been more extensively read than many more pretentious volumes. In these pictures there is evidence of the same care in grouping which so distinguishes Mr. Robinson's efforts; but the model is far inferior to the one we have already alluded to. Probably we find a greater difference owing to the contrast. But if we recollect rightly, the nursery favourite had scarcely such a smirking face as that of any of the figures in these pictures. In this lies the chief fault, that the model has been unable fully to appreciate the task which she has to perform; but in the hands of such a skilful trainer as Mr. Robinson we may hope to see greater results. Altogether, the "Red Riding Hood" series cannot by any means be compared with the other studies we have noticed. While we see many of Mr. Robinson's best productions here, we miss that most charming of all his poetic subjects, "Juliet," that was exhibited at South Kensington, and which we shall not soon forget. There is also one frame which was exhibited at Coventry-street Exhibition, with three studies, viz., "Vanity," "Fear," "Devotion." All these are remarkably clever, but his decided success is his study of "Fear." There is in the face such a true expression of fear, that the inscription is needless. How strikingly it contrasts with those maudlin attempts to illustrate fear, which are constantly made in the ghost pictures for the stereoscope. There is a refined delicacy in the expression which is not to be met with but at rare intervals in compositive photography. What does Mr. Robinson think of the suggestion of illustrating Longfellow's Evangeline? Here is an opportunity for him to enter upon a subject which he is fully competent to handle. There is in that poem all the simplicity and genuineness of feeling which are necessary for this class of picture.

Photographic Chemistry.

CHEMICAL NOMENCLATURE.

(Continued.)

In the next number of the "PHOTOGRAPHIC NEWS" we propose to give a table of the symbols and equivalents of substances used in photography. Before proceeding with the subject of metals and metalloids, we shall describe, as briefly as is consistent with clearness, the nature of the composition of the different gases referred to in the preceding articles.

Oxygen is a transparent and colourless gas, the specific gravity of which is about 1·1007. Its properties will be gathered from the necessary references to it in future articles.

Hydrogen, like oxygen, is a permanently elastic gas, the specific gravity of which is sixteen times less than oxygen. It combines with the latter gas in equal proportions to form water.

Nitrogen, or, as it is sometimes termed, azote, is a colourless and inodorous gas, of a specific gravity a trifle less than oxygen, viz., 0·9748. This gas, in the proportion of 80 parts to 20 of oxygen, forms atmospheric air.

Nitrous acid is formed by condensing the vapour arising from the mixture of oxygen and deutoxide of azote. If 100 measures of the former is mixed with 200 of the latter, it immediately condenses to 100, and the result is a deep red vapour, termed nitrous acid vapour, which, when cool enough, is condensed to the acid above mentioned. The proportions in which nitrogen and oxygen combine to form

Protoxide, consists of ...	100 azote, and	50	oxygen.
Deutoxide	100 "	100	"
Hyponitrous acid	100 "	150	"
Nitrous acid	100 "	200	"
Nitric Acid	100 "	250	"

There are seven hydrogenated acids, or hydracids, all of which are formed by the union of 1 equivalent of hydrogen to 1 of chlorine, bromine, iodine, fluorine, sulphur, selenium, or tellurium. As only one acid is given by the combination of hydrogen with each of these metalloids, the symbols are thus written:—Hydrochloric acid, H Cl; hydrobromic, H Br; hydriodic, H I; hydrofloric, H F, &c.

The union of hydracids and oxacids with bases forms salts; the combinations of hydrochloric acid and nitric acid with potash and lime give salts of those substances. In the formation of hydracid salts one may as reasonably attribute it to a simple union with the base, as to the decomposition of the hydracid, the radical of which, in uniting with the metal of the base, abandons the hydrogen, which, with the oxygen of this same base, forms water. When the reaction takes place, in the midst of a liquid, and the salt remains dissolved, it cannot be known exactly what passes. For example, hydrochloric acid (H Cl) uniting with potash (K O), may as well represent hydrochlorate of potash (H Cl, K O), as the chloride of potassium (K Cl) and water (H O); but if the salt which is formed be insoluble, the decomposition of the acid and the base is rendered visible. It is thus that hydrochloric acid, united to the oxide of silver, gives insoluble chloride of silver and water, which may be thus stated: H Cl + Ag O = Ag Cl + H O, hydrochloric acid + oxide of silver = chloride of silver + water.

In the salts formed by an oxacid it is generally admitted that the acids unite with the base to form the salt; in this case there is no decomposition of the acid or the base; thus: $\text{H O.N O}_5 + \text{Ag O} = \text{Ag O.N O}_5 + \text{H O}$, nitric acid + oxide of silver = nitrate of oxide of silver + water.

The equivalent of water which was united to the acid is alone separated. These two bodies, resulting from the action of an hydracid or an oxacid upon a metallic oxide, are both equally salts.

There is a compound body which, in its general effects, has all the characteristics of a simple body; this body is cyanogen, represented by the cymbol Cy, as if it were indeed a simple body, though it is in truth composed of 2 equivalents of carbon to 1 of nitrogen, $C_2 N$. Cyanogen may be produced by heating charcoal and ammonia in contact. Combined with potassium, it forms a compound very frequently employed in photographic operations, viz., cyanide of potassium, K Cy. It is to the presence of this gas that Prussian blue owes its brilliant colour, and its combination with hydrogen and other bodies produces several acids in very extensive use, among which is included that deadly poison hydrocyanic acid, commonly called prussic acid.

Ammonia itself is a compound possessing singular properties. It is formed of a combination of 1 equivalent of nitrogen with 3 of hydrogen, and when combined with 1 equivalent of water, it, in its action, resembles a metallic oxide, and is by many chemists considered as such.

Chlorine is a greenish coloured gas, and, by its combination with metals, produces the numerous chlorides; and when combined with oxygen in the proportion of 100 parts of chlorine to 111·095 of oxygen, it produces *chloric acid;* and when combined with the same gas in other proportions, it gives protoxide, peroxide of chlorine, &c. Hydrochloric acid, or muriatic acid, is likewise formed from a combination of chlorine with hydrogen. Chlorine destroys most vegetable colours submitted to its action.

Resembling chlorine in some of its properties, and derived from a similar source, iodine, in combination with various substances, is extensively used in the practice of photography. It may be obtained by drying and powdering seaweed, and treating it with sulphuric acid; a vapour of a violet colour is given off, which, if received in a cool body, condenses on its sides in the form of scaly crystals, having a somewhat metallic lustre. These crystals are the substance termed iodine. It has the power of destroying vegetable colours, and combined with oxygen or hydrogen, forms acids. It also combines with oxygen, producing the substance termed iodic acid.

Another substance resembling the two preceding can be obtained from bittern, the residual liquor which remains after the salt has been removed from a large quantity of sea-water—this is termed bromine. The process of obtaining it from bittern is somewhat complicated. It combines either with oxygen or hydrogen, forming in the first case bromic acid, and in the latter hydrobromic acid.

(To be continued.)

Dictionary of Photography.

Accelerating Agent (*continued*).—Mr. Maxwell Lyte has described a very excellent accelerating agent—honey. The whole basis of his process consists in the great reducing power of grape sugar, when mixed with pure nitrate of silver, and applied to the sensitive plate. On account of the difficulty of procuring perfectly pure grape sugar, as the commercial article is almost always adulterated with foreign substances, it is preferable to use honey, which seems to meet all ends. It is much to be preferred that the honey should be old and candied: not the ordinary Narbonne honey, which is most frequently merely

honey adulterated with water, but good, pure honey, which has been kept for a long time, and which, by exposure to the air, has become perfectly solid, or nearly so. The plate being, first of all, prepared in the ordinary way with collodion, and the usual nitrate of silver bath, is to be withdrawn and allowed to drain. Then make a syrup composed as follows:—

Nitrate of silver	200 grains.
Distilled water	12 ounces.
Old honey	8 ,,
Alcohol	1 ,,

Mix and filter in diffused daylight, and then carry the liquid into a dark room, and filter through animal charcoal until colourless: place a lump of camphor in the latter, and let it stand for a short time, and it is ready for use. After the plate which has been removed from the nitrate of silver bath has drained for a few minutes, this syrup is to be poured over the plate, and then, after a second draining, the plate is ready to be placed in the dark frame. This method of preparation yields a film of such exquisite sensitiveness, that Mr. Lyte has succeeded in taking by its means ships sailing and waves breaking. In a warm climate a plate thus prepared will not keep its great sensitiveness for more than an hour, but, in England, instantaneous pictures may be taken after four or five hours keeping. Pyrogallic acid is to be used for developing.

Under some conditions of the nitrate of silver bath and collodion, the addition of glycyrrhizine to the former acts as a powerful accelerating agent. The best kind of collodion to be used for this purpose is a colourless cadmium one, neutral, or slightly acid to test paper, and giving a tolerably creamy film. The nitrate of silver bath is to be made in the following way:—

Fused nitrate of silver	600 grains.
Iodide of cadmium	3 ,,
Alcoholic solution of glycyrrhizine (strength 5 grains to the ounce)	1 drachm.
Alcohol	3 ,,
Glacial acetic acid...	10 minims.
Water	20 ounces.

The nitrate of silver and iodide of cadmium must each be dissolved in a small quantity of the water, and then mixed and agitated until the precipitated iodide of silver has redissolved in the nitrate of silver, then add the glycyrrhizine, acid, and alcohol, and, lastly, the remainder ot the water. It should be filtered before using.

If it be wished to add the glycyrrhizine to an old nitrate of silver bath, it can be effected as follows:—add the required quantity of alcoholic solution to the bath, and, after well shaking them together, coat a glass plate thickly on both sides with collodion, plunge it in the bath, and allow it to remain there for about twenty-four hours; at the end of that time remove it; filter the bath through fine filtering-paper, and it will be fit to use.

The proper kind of developing solution to use for this purpose, is one containing less acetic acid than usual. If there be more than 10 or 15 minims to the ounce, the negative will be wanting in vigour and density, the acid having too retarding an effect on the reducing power of the pyrogallic acid. A little alcohol may be added if necessary, to make the solution flow readily over the plate.

More than extra care will be required in working with glycyrrhizine in the bath. The sensitiveness of the film is so much increased, that circumstances which would have been without effect in the ordinary process, will here give rise to stains and markings. Vertical lines in the direction of the dipper are liable to be produced, if the plate be not moved up and down several times whilst in the bath. The plates should also be drained, and the excess of bath solution blotted off the back with filtering paper, otherwise, peculiar wavy markings are liable to be produced. Dust and insoluble particles floating about in the collodion, or any of the solutions, carefully as they should be avoided in any photographic process, must, in this case, be especially guarded against. Even with every precaution to insure success, the operator must make up his mind to occasional failures when working with glycyrrhizine in the bath. The whole action of this resin-sugar is veiled in obscurity and uncertainty.

(To be continued.)

A Catechism of Photography.

IV.—GENERAL PRINCIPLES OF PHOTOGRAPHY.

Q. What does the art of photography comprehend?

A. The art of photography comprehends the whole of the operations of which the object is to obtain a picture by the action of light.

Q. Upon what principles do these operations depend.

A. Whatever may be the peculiar process of photography adopted, it is necessary to obtain a sensitive surface; that is to say, a surface which is readily affected by the chemical action of light.

Q. What are the sensitive surfaces generally employed?

A. A chemical combination of silver with other different bodies, chiefly *iodine*, *bromine*, *chlorine*, &c. The iodide of silver is the most important; but when employed alone, the action of the light is slow, and it is preferable, on this account, to use it in connection with other salts of silver, such as bromide, chloride, cyanide, or nitrate of silver. By this means the chemical effects produced by light are increased in rapidity.

Q. What distinction is made as to the different kinds of sensitive preparations?

A. These may be divided into two classes, namely, those which produce a picture solely by the action of the light, without requiring any subsequent development; and those which, after being exposed to the light, require to be developed by the application of other chemical action.

Q. How may a picture be produced by the sole action of the light on the sensitive surface?

A. The chloride of silver impregnated with the nitrate of silver, and used in a dry state, is capable, by the sole action of the light, of producing pictures of great vigour and intensity.

Q. Is this the sensitive surface commonly employed?

A. It is chiefly used in obtaining proofs technically termed *positives*. As it is relatively slow in action, it is not used in the camera.

Q. What preparation is used for obtaining those pictures which have to be afterwards developed?

A. Iodide of silver is generally employed, to which is added some other salt of silver, such as the nitrate of silver, which increases the sensitiveness of the surface to the highest degree.

Q. Is a surface so prepared rapidly acted upon by the light?

A. It is so extremely sensitive as to be acted upon by the feeblest ordinary rays, and is therefore specially adapted for taking pictures in the camera.

Q. Is not the sensitive coating affected by light during the process of preparation?

A. The sensitive coating for positives or negatives must always be prepared in a room from which the chemical rays are excluded. When so prepared, the plate, paper, or glass on which it has been formed, is placed in the frame adapted for its reception, and exposed to the light.

Q. What is the effect?

A. The action begins immediately; producing as the natural result, whites, blacks, and half tones, the surface being affected with a rapidity proportionate to the intensity of the light.

Q. How long must the sensitive surface be exposed before it is affected by the light?

A. The time of exposure varies according to the nature of the preparation; it is very short for the collodion plate, and longer for the albumenised paper. Even when the preparation used is precisely the same, the time varies according to the intensity of the light. In this, practice alone can guide the operator.

Q. Has the operator simply to take into account the intensity of light and sensitiveness of the preparation?

A. In taking a picture in the camera, the operator must bear in mind the colour of the object to be photographed, its distance from the camera, and the colour as well as the intensity of the light which falls upon it.

Q. Is a picture taken in the camera visible immediately on being taken from the camera?

A. The images obtained in the camera are usually invisible until they are developed by another process. The chemical agents used for this purpose are very numerous; amongst them are—gallic acid, pyro-gallic acid, sulphate of protoxide of iron, mercury, &c.

Q. How is this operation of developing the picture or image to be performed?

A. The operation must take place in a room from which the chemical rays are excluded, and the process must be conducted with great care in order that it may be arrested at the proper moment, which can only be ascertained by experience.

Q. After the picture is developed, is it affected by the action of light?

A. The surface retaining its sensitiveness would immediately blacken on being exposed to the light; hence it is necessary to destroy its sensitiveness.

Q. How can this be effected?

A. The operation is accomplished in two ways; the preparation may be rendered insensitive, and that portion which is not necessary to the formation of the picture may be removed; the second process, which is generally considered the best, consists in completely eliminating all the unchanged sensitive coating.

Q. How can this be done?

A. By the employment of an agent capable of dissolving the part of the sensitive coating not acted upon by the light, without affecting the picture.

Q. What is the best solvent for this purpose?

A. Hyposulphite of soda. The operation is termed fixing the proof. The pictures are then washed and dried, and if the different operations have been performed with proper care, they may be preserved for an indefinite period.

(*To be continued.*)

Microscopic Photography.—M. A. Bertsch has succeeded in reproducing, by photography, the parasite of the parasite of the bee, by magnifying it 1,000 diameters, that is to say, 1,000,000 times in surface. This acarus, says the *Patrie*, unknown hitherto, is covered with a superior carapace in form of an arched roof. Its claws, armed with air-holes and sharp claws, enable it to fix itself in a powerful manner upon the microscopic insect which carries it about, and at the expense of the feebleness of which it feeds itself. In the mysteries of creation, where ceases these strange series of the infinitely small?

Correspondence

VIEWS FOR PHOTOGRAPHERS NEAR LONDON.

[Several correspondents have favoured us with suggestions on the above subject. Whilst we beg to offer our thanks to all, we have selected the following extracts, as being likely to interest our readers.]

Sir,—If any of the following suggestions, taken with the many others you will doubtless receive, are of the least use, I am fully repaid. Every place mentioned I have myself visited on foot.

To *Watford* by *slow* train: alight at Bushey station (not going into the town of Watford), then westward to *Hamper Mill*, on the Colne (a gem), an extensive view, looking towards the north-west from a field opposite the entrance gate; then southwards, towards Pinner, from a field near the residence of Mrs. Marsh, may be seen westward *Ruislip Common and Reservoir;* proceed still towards Pinner, from the carriage drive of *Mr. Faulkes* (the outer gates are generally open), Epsom race stand, distant forty miles, may be seen; then to Pinner station, and so home.

Or, having reached *Hamper Mill*, cross two fields, and over a style into *Moor Park*, the seat of Lord Ebury (all public walk), from a spot near the house is a most magnificent view north-east; then, leaving the park by the south-west lodge, is a very extensive view looking west.

Then to Rickmansworth, and home by the Watford station, from which there are late trains.

N. B. Thirty-six gallons of table beer are every day placed in the market-place of the village of Rickmansworth, *pro bono publico*.

Or to Watford station, thence to *Cashiobury*, the seat of Earl Essex, through which there is a public path. To see the beech trees alone would repay one for a journey of 500 miles. There are charming little bits towards *Aldenham*, *Bushey Heath*, *Croxly Green*, *Chorley-wood Common*.

Or go by train to *Bromley*, Kent, then by public conveyance towards Sevenoaks, alight at the *Polhill Arms* on Malmscott hill, and revel for a long day in the beauties of the most lovely scenery, and home by same route.

Or alight at the turnpike gate at Pratt's Bottom, walk to Knockholt, and get admission to *Chevening*, the seat of Lord Stanhope; 'tis thrown open every Wednesday after one. Then go and count the Knockholt beeches till dinner time, and get back to Pratt's Bottom in time to catch the coach.

Or, being at Bromley, go (all public) across *Sir S. Scott's Park*, *Bonner's Park*, or to the best cricket ground in England, *Chislehurst;* have a peep at the *Church*, and return by the road passing through Widmore; these latter famous, *teste* the works of Mr. A. Melluish, Mr. B. Smith, and others.

Then there are not a few, engaged all the week in London, who go by early train to Epsom, and walk over the Mickbarn-downs to Box-hill or Dorking, have dinner, and home by train through Reigate, and *they* can testify to the beautiful views they saw, and the proprietors of the hotels to the huge dinners they ate.

A walk from Gadstone to Reigate passes many beautiful places. The Rook's-nest at *Gadstone*, *Nutfield*, Bletchingley, all rich with quaint old chimneys and gables.

Or go to Abbey-wood station, by conveyance to Bexley Heath, walk to Bexley, then by *North Cray Church* to Foot's-cray; but a visit to this country particularly requires inquiry about conveyances, which are usually in a transition state. There is most beautiful foliage at Foot's-cray Place (Lord Bexley's), and also beautiful spots on the river Crouch.

Or go to Ponders End station, walk to Chingford, then through a part of Epping Forest to Woodford.

Or to Staines, see rectory-house, Ankerwyke yews, &c., cross the bridge, and go by Old Windsor to Windsor.

18*th September*, 1858. Sarah C. M.

SIR,—Permit me to mention a few spots in and near London, which I think would be available to the photographer.

The first I shall name is Dartford. The camera might be placed close to the railway station. The view would comprise a portion of the river Darwent, but more like a lake than a river, with a good deal of pretty weed floating in the water, and picturesquely surrounded, as it were, with willows and other trees, many of them drooping over the water. At a short distance would be seen a very extensive building, a paper manufactory. I would suggest a walk between Strood and Maidstone, including Darnley Park, and Cobham Hall, the Medway, and the hop gardens (when approaching ripeness). This I propose surveying, as also the country between Dartford and Sevenoaks, which, I am told, abounds with antiquated houses and country scenery. I propose also a walk from Woolwich to Erith. There is a pretty bit between Abbey-wood station and Beadon-well, but it is all up hill, and I found a fly from the station very acceptable (it carried five, and cost two shillings and sixpence). I was not able to photograph this, as I had an engagement a little farther on. Purfleet appears very pretty from the water, and I have no doubt several good views might be taken there.

Between Carshalton church and West Croydon station there are various picturesque views; Carshalton parsonage and Wandle seen from near the church, the road to Beddington, Beddington church, churchyard, house and park, with crows' nests, the Wandle, clear stream weeds, felled timber, &c., Wootten Mill, on the Wandle, towards West Croydon.

Wimbledon Park, approached from the station, would be a quiet place to take some views of foliage.

Doubtless the towing path between Hampton Court and Weybridge would be available, keeping the camera away from the water's edge, in order to allow the towing horses to pass, otherwise both photographer and camera might perform an involuntary summersault on the slack rope.

On, and between Clapham and Wandsworth Common, one or two views might be taken, though, as far as I have seen it, not equal to Hornsey for the camera.

Norbury Park and the Mole may be said to be the perfection of wooded scenery. The parts I know are between one and two miles from the Box-hill station. A good view of Box-hill can be had a very short distance north of the station.

The view from the terrace, or from the Star and Garter, Richmond (or park if allowed), may be mentioned, but I am not very sanguine that it would form a pleasing camera picture. If a sufficient breadth of country were taken to form a panorama, the effect would be improved, but this, I think, could only be properly done with a panoramic camera, not adapted to the tourist of a day.

I understand that Perivale church is the very picture of a country church, and ought to be photographed. I have not yet seen it.

From photographs I have seen, and what I have read of the topography, I should judge that about St. Albans a good deal would be found to suit the camera. I have the treat in store.

One day I mounted Muswell Hill, from Hornsey, and passing the road-side inn, with pond in front, kept to the right, and getting over a style, or between some posts, I found an excellent view of the new County Lunatic Asylum at Colney Hatch from the fields. It reminded me somewhat of Robertson's views of Constantinople.

There is much ground about Hampstead Heath that the photographer might occupy. Mr. Archer once told me that on a clear morning, and early, the Crystal Palace might be seen from the heath, with St. Paul's, as it were, in a valley beneath. There is a secluded nook almost closed in with timber north of Highgate ponds, on the east side of Caen Wood, that would be available on an exceedingly bright day.

Mr. Archer also told me that between Forest-gate station and Leytonstone, were some trees that would form good separate studies.

I saw a magnificent view, by Archer, taken in Eltham Park, but I believe it was by extraordinary favour that he gained admittance.

The scenery is rather hilly and wild about Buckhurst Hill, between Woodford and Loughton. There is a curious oak, split in two parts, both living, between the turnpike, Woodford, and the Bald Faced Stag.

I propose investigating Chigwell-row, Hainault Forest, starting from Woodford station.

There are some pretty bits of the New River, castellated engine house, &c., along the "Green Lanes," running north from Highbury-park, Stoke Newington, and the new church, Stoke Newington, would form a good interior view, I should think, the capitals of the columns being foliated, and there being carved work about the chancel.

There are many days on which fine views might be taken about London; for instance, St. Paul's, and each bank of the river, and bridges; from Southwark bridge, a very retired spot, St. Paul's, and the Temple gardens; Somerset House, and the Houses of Parliament, from Waterloo and Hungerford bridges; the Crystal Palace, the river bank, and Westminster bridge, with a glimpse of Lambeth palace, in one view, from the Strand end of Hungerford bridge. I was much struck with this one magnificent day this summer, and we have had very many such days.

At low water I think a venturesome photographer might take good views of Lambeth Palace, and the Houses of Parliament from the middle of the river. There are a few dry spots. Let him be provided with fishing boots, and a boat not far off, and commence operations as soon before low water as possible.

I may mention that I find the late Mr. Scott Archer's camera an excellent one for working wet collodion in the open air, as it enables me to dispense with a tent. The only chemicals I carry are collodion, silver bath, and developer, with a bath of common water to dip the plate in after developing. Mr. Archer did all his pictures so, and they are equal to any. His improved plate box is a capital contrivance, each plate rests in a separate cell, in the same way as in an ordinary dark slide, resting on the corners only. There is also a plan of ventilating the camera, which is pleasant in hot weather, and prevents the vapour of ether being inhaled. I inclose a print from a negative, over-exposed, which I took last year, on Good Friday, the only whole holiday of the London man of business. That day this year was unfortunately too windy for outdoor operations.

20th September, 1858. W. E. H.

TO REMOVE THE BLACK VARNISH FROM GLASS POSITIVES.—TO OBTAIN STRONGLY PRINTING NEGATIVES FROM FAINT GLASS POSITIVES.

Edinburgh, September 27th, 1858.

SIR,—Your idea of a weekly photographic newspaper appears undoubtedly the right thing at the present time, a time far too advanced for the slow pace of the monthly journals; very good in their way, doubtless, but that way, a way necessarily obstructive of all activity in correspondence,—no mean agent in promoting the development of any science;—so I not only wish you, but consider that by your right decision, you have already more than half achieved an eminent success.

Even in your three first numbers, your answers to querists have thrown much light on some of my own difficulties; while again some of their questions have indicated one or two points where my private experience might be useful to them. Thus, in "*Removing the Black Varnish from Glass Positives,*" I would at once say, use chloroform—methylated chloroform for cheapness; it acts like magic, for no sooner has the plate been immersed in a flat dish of the fluid, than the black varnish liquefies, and flows off as if it had never been solid. Thick lumps of the varnish about the edges give a little more trouble, but they, too, yield in not many

more seconds, and to simple contact with the fluid, without any mechanical rubbing. Out of some seventy plates black varnished six months previously only two went wrong, and those from my trying the effect of a wash of distilled water after the chloroform. The moment the water touched the collodion film, it loosened and floated off; but as long as chloroform only is used, you may treat the plate in any way without the smallest danger of injuring the collodion.

When the above opaque positives were thus brought back to their primitive state of transparent negatives, they were far too faint to print from. How, then, to intensify them? On a few I tried a pyrogallic developer and silver, but its precipitation was so very unequal, and there was such continual floating off of parts of the picture under the action of the watery solution, that I soon abandoned that, and availed myself of what is in other cases a natural difficulty, viz., the intensifying of lights and shadows under continued photographic copying. On this principle, from the original very faint transparent negative, was made a transparent positive on glass, stronger in every way in its lights and shades; and from that again was made a second negative, when the black parts could be brought up to such density as to print, if necessary, perfect whites.

One of the plates in the photographically illustrated book recently produced by Mr. Lovell Reeve, "Teneriffe, an Astronomer's Experiment," was printed from such a *second* negative, which, in its turn, was taken through the medium of a transparent positive from a *first* negative, which had actually passed the several earlier months of its existence as an opaque positive, backed up with black varnish, and mounted on a mahogany board, and it was weak even then. Nevertheless 2,000 paper copies have been already printed from it through means of its "second negative," and the public demand will alone settle how many more copies may still be taken. C. P. S.

Photographic Notes and Queries.

SIMPLE METHOD OF FINDING THE FOCAL LENGTH OF SMALL CONVEX LENSES.

SIR,—Can you tell me an easy way to find the length of focus of a view lens?

I purchased a large-angled stereoscopic lens, the focal length of which was stated to be 3¾ inches, thinking it would work quicker. Now, I had been using a 4½ inch focus lens, and, as my camera was not an expanding one, I thought I should have to get a new and shorter one: however, I fitted the 3¾ lens on a temporary front, and found on focussing a distant building that my present camera would do, and that the distance from the ground glass to the lens was between 4 and 5 inches. I expected that it would have been between 3 and 4, if the focus of the lens was 3¾ inches. If you can give me any advice on the subject in the next number of the "NEWS," I shall feel very greatly obliged. J. N.

[Perhaps the following paper, which was communicated some time ago to the *Monthly Notices of the Astronomical Society*, by the Rev. T. W. Webb, may prove useful to many of our readers:—

"The determination of the focal length of a small convex lens is a matter of considerable difficulty, at least in the hands of an amateur. Not only is the process of direct measurement a delicate and somewhat troublesome one, but the result is not satisfactory, as it is complicated with uncertainties, arising from the amount of spherical aberration, which, with a large angle of aperture, may have a considerable effect, from the thickness of the lens, and from the difference of the measure from the centre and from the margin of the posterior surface.

"These difficulties, it is true, are avoided, as to the usual object of such measurements, by the employment of the dynameter, or any equivalent contrivance by which the focal image is measured instead of the focal length; but, as these optical means are not always at hand, it may perhaps be of some use to explain a mode of measurement practised by myself very successfully more than twenty years ago. The requisite apparatus, if it can be so termed, will be described in its original simplicity; a little ingenuity would easily improve it, but even in its first rude trial it was found adequate to its object:—

"Three pieces of cork are perforated by a knitting-needle, so as to slide along it. To the centre one is attached, in a vertical position, and with its axis parallel to the knitting-needle, the lens to be measured; in each of the others is inserted a piece of a sewing-needle, with the point uppermost, and having its length so regulated, that a line joining these points would pass, as nearly as may be, through the centre of the lens. The cork discs carrying these needles are then moved backwards and forwards, till the inverted image of the one needle's point, formed by rays passing through the lens, is seen coincident and equally distinct with the other needle's point, when both are viewed at once through a tolerably strong magnifier applied to the eye, and directed towards the lens. Then, if the needles' points are sensibly equi-distant on each side of the lens—a condition which can be sufficiently attained in course of a few trials—it is evident that they occupy the conjugate foci; and the distance between them being carefully measured with compasses, will be, as a very simple proposition in optics will show, *four times the amount of the focal length of the lens for parallel rays.*

"The apparent defect of this method is the uncertainty whether the points, when the image of one is formed close to the other, are equi-distant from the lens, the setting of which, or its form, unless equally convex on each side, may render actual measurement unsatisfactory. A brief and simple calculation, however, will show, that any uncertainty in the focal length for parallel rays arising from this source of error, would be so small in proportion to the corresponding change in the relative position of the conjugate foci, that the needle-points would be obviously and unmistakably out of their proper places—that is, at very sensibly unequal distances from the lens—before the resulting focal length would be materially affected. On the other hand, the advantages of this method are easily to be recognised. All errors are eliminated which arise from spherical aberration, the thickness of the lens, or the difference between the length of the marginal and that of the central ray; and the quantity actually measured being four times greater than the final result, introduces into the latter a microscopical precision, while the actual process of measurement requires nothing but a careful eye, a steady hand, and a little experience, to insure a degree of accuracy quite sufficient for all practical purposes."]

REMEDY FOR FOGGY PICTURES.

Plumstead, 27th September, 1858.

SIR,—As you are so kind as to answer the queries of your correspondents in the "PHOTOGRAPHIC NEWS," I have

taken the liberty to ask you if you can give me any idea as to the cause of a certain fogginess which I get upon glass positives? I am but a young beginner, and have not as yet attempted to manufacture my own chemicals, but purchase them from a party who is a fellow workman, and a very good amateur. If I am copying prints or engravings, which I fix against a wall which runs due east and west, I get really good copies, no matter how much black there may be in them; but when I attempt a portrait, for which I am obliged to use a yard, with the sitter's face towards the *west*, the blacks or dark parts of the picture are invariably extremely foggy. I at first thought it was the lens, and fixed a diaphragm between the two lenses in the centre of the tubing; but still the fogging continued. I have since blacked the whole of the inside of the camera and tubing with a dead black. The next thing I tried was to have my bath tested; that was correct. I have since had a new stock of solutions, but it is of no use, the fogging is still there, so that I am utterly at a loss how to account for it. If you, sir, can give me any help in my dilemma, you will oblige

Your sincere well-wisher,
AN AMATEUR.

P. S.—The yard I work in is *very light*, and has a window on the north side, upon which the sun shines from about eleven a.m. to four p.m., but I have screened that. Can you, sir, at the same time, give me a recipe for a good developing solution for glass positives?

[We should recommend our correspondent to try first the following experiment:—Prepare a plate; and after keeping it exposed in the dark room (which must be kept closed during the time) for five minutes, pour the developing solution on, and proceed as if a picture were being developed; fix and wash as usual, and then bring the plate to the light and examine for fog. If there be any, the fault will arise from the chemicals being impure, or the dark room not sufficiently dark; and a repetition of the experiment, with further precautions against the ingress of white light, will soon show which is to blame. If, however, the plate shows no signs of fogging, the fault must lie in the camera, or arrangement of light. Try if the camera is light tight by the method given in vol. i. p. 12, and if it stands these tests, follow the plan given in answer to "No Eyes," vol. i. p. 36.]

ON PRINTING POSITIVES.

DEAR SIR,—A novice in photography has found some difficulty in obtaining a good colour for his positive proofs; his bath gives generally a light brown, occasionally approaching to slate colour, but he wishes to obtain a deep rich chocolate. I give you the form of the bath used. You may from this suggest whether it is likely to produce the colour required. Would you seek for the failure in the manipulation, or in a want of purity in the chloride of gold? I confess I suspect the gold.

TONING BATH.

Hypo.	4 oz.
Distilled water...	4 oz.—dissolve.
Chloride of gold	4 grains
Distilled water	3 oz.—dissolve.

Add this solution to the former one gradually, continually stirring with glass rod.

Nitrate of silver	30 grains
Distilled water	1 oz.—dissolve.

Mix with the above solution.

If you could offer a word of advice in your next number of "THE PHOTOGRAPHIC NEWS," I suspect you would oblige many more besides a

NOVICE.

[The above formula is a very good one, with the exception of the addition of the nitrate of silver, which we do not recommend.

Obtaining good rich brown prints does not so much depend upon the toning bath, as upon the strength of the salting and silver baths. Use a 30 grain solution of salt, and 120 grain solution of nitrate of silver, and the pictures will be very brilliant and vigorous, whether the toning and fixing be performed in the above bath, or as recommended at vol. i. p. 33. We are inclined to recommend the latter formula.]

GLYCYRRHIZINE.

SIR,—I shall feel obliged if you will inform me what glycyrrhizine is? I have an idea that it is a substance in the composition of which sugar enters, but beyond that fact I am in ignorance; besides, how and in what stage of the process is it used? ALASCO.

[Glycyrrhizine is an organic compound, half resin, half sugar, but not susceptible of fermentation. It has a great tendency to enter into combination with bases, and unites with the alkalies and earths forming compounds soluble in water. It may be prepared as follows:—Make a concentrated decoction of liquorice root, strain the solution from the woody fibre, and then add dilute hydrochloric acid until no more precipitate falls. Filter and wash the precipitate on the filter with a little cold water until the filtrate is free from any acid reaction; then dissolve the precipitate (which is impure glycyrrhizine) in alcohol, and evaporate to dryness at a gentle heat; the glycyrrhizine will be left behind in the form of a brilliant transparent brownish mass. It is sparingly soluble in cold water, especially if acidulated, more so in hot water, and very soluble in alcohol; it has a sweetish taste, and leaves a disagreeable bitterness in the mouth. It was first employed in photography by Mr. Hardwich. See answer to G. B., vol. i. p. 35, and the article on "Accelerating Agents" in the present number.]

BACKGROUND WITH LIGHT CENTRE.

MR. EDITOR,—I shall take it as a great favour your informing me what is the best background I can use for general purposes? I saw a negative from Hennah and Kent's the other day, that had a nice artistic light thrown about the head. Can you tell me how it is accomplished? I have generally used one painted in distemper, and have tried to paint in a light on the background, but it did not answer. Is there any peculiar way to throw a light on it? I thought of having a background of thin material, with a round window behind it. Do you think it will answer? I have so seldom seen good backgrounds in pictures, that I take it there must be some secret in it. I read in a contemporary of having a dark curtain to draw, but that would not give a halo. If you can give me any information on the subject in your next paper, I shall esteem it as a great favour.

In all the papers I have read on photography, and they are nearly all the works published, I have not seen any really good information about background, which would be useful to both amateurs and professionals. J. B. P.

[The effect of light behind the head of a sitter may be easily produced in the following way:—Take the portrait with a very light background behind it, and after printing a positive from it, place the latter, before fixing, in the printing frame, and cover the whole of the figure with opaque paper, cut roughly out of the proper size, and pasted on the glass; then arrange

cotton wool in the centre of the picture, so that the light may be obscured to the required extent, and again expose to light. A little care is required, but the result is well worth it. We believe there are other methods of producing a similar effect, but we are not in possession of the *modus operandi.*]

DISPOSING OF POSITIVE PRINTS.

DEAR SIR,—I am an amateur in the photographic art; and having seen in your first three numbers the kind and also practical manner in which you have answered numerous correspondents, I am emboldened to tax your courtesy myself, merely pleading as an excuse a "Constant Subscriber."

In the first place, I am not so placed in life that I can afford the numerous trifling expenses in the prosecution of the art without an equivalent remuneration, merely to cover the expenses of working stock and apparatus.

I have a stock by me of positive prints, printed from various negatives, which I believe to be of a very good quality. Can you tell me how I may dispose of copies, so that I can clear my working expenses?

If you could, in your press of business, find time to tell me who are buyers of those articles, and about the prices given, you will indeed oblige

Your obedient servant and well-wisher,

PHOTO.

[We do not think we can serve "Photo's" purpose better than by giving insertion to the above letter, and asking if some of our correspondents can favour us with suggestions on this point. Doubtless many amateurs would be glad of similar information, and if we can assist them in any way we shall feel great pleasure in so doing.]

ANSWERS TO MINOR QUERIES.

QUERIES ON THE HONEY PROCESS.—*C. E. W. H.* has several times attempted and failed with the honey process, and asks several queries on the subject. We give the information asked for, but, at the same time, must say that in our hands the honey process has not proved nearly so successful as either the oxymel or Fothergill process. The time which may be allowed to elapse between applying the honey and developing the picture, should not exceed three days, and the exposure may take place at any point of the intervening time. We find it better to throw away the first portion of honey and water poured over the plate, and then to pour on a second portion, which may be allowed to remain for two or three minutes, and then poured back into the bottle. It will be found a good plan to rest the plates face downwards in a basin, with boiling water, to within half an inch of the plate, before developing; after being thus steamed for ten minutes, the honey can be sufficiently removed from the plate by a few rinses in cold water, to allow of the development to be proceeded with. The process will not answer for positives. The organic matter in combination with the nitrate of silver, on the surface of the plate, produces a slight decomposition, which would give a veiled effect to the positive. See the remarks on this subject, in vol. i. p. 24.

PRINTING POSITIVES ON IVORY.—*An Amateur Subscriber* is desirous of knowing how, when, and where the process of printing positives on ivory may be learned. We have had very little practical experience in this matter; and, although we have succeeded sometimes in taking good pictures on ivory, the process we adopted is not sufficiently certain for us to give it as a reliable one for amateurs. Other better processes are in existence, and we shall feel obliged if some of our correspondents who may have been successful will favour us with information on this subject.

GLASS TRANSPARENCIES FOR THE MAGIC LANTERN.—*A Subscriber* desires information on the above point. In our answer to *J. C.*, vol. i. p. 22, we gave the results of our experience on the subject of transparent positives. They will be found well adapted for the magic lantern if *plain* glass be used instead of ground glass for printing them on.

BLACKENING OF THE POSITIVE SILVER BATH.—*J. P.* has a sixty grain positive silver bath which has been used for making albumenised paper sensitive, it has turned black and deposited a black sediment at the bottom. Pure china clay (Kaolin) added to the bath in the proportion of about half an ounce to the pint, and well shaken together, will decolorise it and restore its good properties. The addition of oxide of silver has also been recommended, and we should think exposure in a flat dish in the sun would prove an effectual remedy, but we cannot speak positively of the latter plans.

ARTIFICIAL LIGHT FOR NIGHT PHOTOGRAPHY.—*W. T.* wishes to know how a composition may be prepared which will give a brilliant light suitable for photography at night. The following is the receipt for, we believe, the best white fire known; it is the signal light composition employed by government:—

Nitre	7 lbs.	
Sulphur	1 "	12 oz.
Orpiment...		8 oz.

This last body is sulphuret of arsenic, and consequently the fumes from the burning composition are very poisonous, and must be carefully carried off by a chimney.

TO CORRESPONDENTS.

F. P. G.—The paper negative you inclosed would, in our opinion, have turned out very well had it been developed longer; it is very clean, and has all the appearance of a good negative when half developed. If you find your process will not give intense negatives on further development, try the calotype process in the present number.

Σκοτος.—If you follow the process given in vol. i. p. 33, employing one part albumen to three parts water as the solvent, you will obtain very good prints with hardly a perceptible glaze on the surface. We decidedly recommend a stereoscopic camera, with twin lenses.

BOVIUM.—The reason must be either an insufficient strength of fixing solution, or a peculiar state of the pyroxyline in the collodion; for which see vol. i. p. 36.

SUBSCRIBER.—The only objection to the employment of sensitive dry collodion plates for portraiture is their slowness. If you can overcome this difficulty by means of more light, or larger aperture to the lens, they would be as good as any for negatives. We cannot recommend particular houses; consult our advertising columns.

AN UNSUCCESSFUL BEGINNER.—The method will soon appear in our "Catechism."

T. C.—Thirty seconds in a good light is an enormous time to expose a collodion plate for a portrait. The fault must be in the lens; for if the silver bath be in good condition, and the collodion made by any well-known maker, a good lens will not require more than three or four seconds exposure. We do not know the reason of the second fault; it is a very general one; perhaps a little bromide of cadmium in the collodion would remedy it. See fifth answer to "Caustic," vol. i. p. 21.

S. J. T.—We are sorry we cannot help you further than by recommending you to study our "Catechism" and "Chemistry," and refer from time to time to the advertising columns. Experience is what you chiefly want.

L. T.—We are not aware that there is any establishment near London, where one could borrow books on photography (as from a circulating library), or have the use of chemicals for experiments in the same by payment of a small sum. Such an establishment would in our opinion prove a great boon to amateurs, and we should think would prove of some benefit to the proprietor. 2. We cannot undertake to give that kind of information. 3. The use of the ¼ grain of iodide of potassium in the formula for the nitrate bath, is to saturate the nitrate of silver with iodide of silver, and thus prevent the iodide on the film from being eaten away in the bath.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 5.—*October* 8, 1858.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE twenty-eighth annual meeting of this important association was held this year in the enterprising and flourishing town of Leeds. The reports which daily appeared in the morning journals during the sittings of the association, gave sufficient evidence that the various departments of science were receiving due and careful attention at the hands of the several committees which were appointed to superintend the separate sections. Photography, as a matter of course, received proper attention; and as this is the particular department in which we are most interested, we have taken the trouble of collecting all the information which we could upon the subject, and we are glad to say, that our applications have met with prompt attention on the part of those gentlemen who contributed papers on that occasion. We beg to thank them for their courteous liberality. Whilst photography has been made the subject of separate, and specific consideration, it is not a little pleasing to see the very general manner in which it was alluded to in other sections of the association. For instance, in the magnificent opening address of Professor Owen, there is a retrospect taken of photographic progress, which, however, we are sorry to say, is not over correct in many of the facts and details. He proceeds to say, that "Photography is now a constant and indispensable servant in certain important meteorological records. Applied periodically to living plants, photography supplies the botanist with the easiest and best data for judging of their rate of growth. It gives to the zoologist accurate representations of the most complex of his subjects, and of their organisation, even to microscopic details. The engineer at home can ascertain, by photographs transmitted by successive mails, the weekly progress, brick by brick, board by board, nail by nail, of the most complex works on the Indian or other remote railroads. The physician can register every physiognomic phase accompanying the access, height, decrease, and passing away of mental disease. The humblest emigrant may carry with him miniatures, such as Dow could not have equalled in the perfection of their finish, of scenes and persons which will recall and revive the dearest affections of the home he has left."

We also notice, in a report of the Kew Committee of the British Association, that photography has been called into requisition for the purpose of recording observations. It says, "The photo-heliograph, erected in the dome of the observatory, has been repeatedly at work since the beginning of last March, and excellent photographic pictures of the solar spots and faculæ were obtained. Certain alterations have been made by Mr. Welsh, in order to regulate the time of exposure of the collodion plate to the sun's action; with these alterations, the instrument gives very good results; but certain improvement in the arrangements of the secondary magnifying lens are under consideration, with a view of avoiding the depiction, on the collodion negative, of the inequalities of the glasses which compose it. The committee recommend that arrangements should be made for the appointment of a competent assistant, who will undertake the taking of photographs, and the preparing of a certain number of copies for distribution to some of the principal British and foreign observatories." To follow out this recommendation of the committee, there will be necessarily an increase of expenditure, amounting to nearly £150 per annum.

But by far the most important allusion to photography is that made by Sir John Herschel, in his introductory remarks as president of section B, devoted to chemical science, which, for close reasoning, acute observation, and the logical arrangement of facts, make it one of the most brilliant speeches which we ever recollect having been delivered on photo-chemical science. He says:—

"Hitherto the more attractive applications of photography have had too much the effect of distracting the attention from the purely chemical question which it raises; but the more we consider them in the abstract, the more strongly they force themselves on our notice; and I look forward to their occupying a much larger space in the domain of chemical inquiry than is the case at present. That light consists in the undulations of an ethereal medium, or at all events agrees better in the characters of its phenomena with such undulations, than with any other kind of motion which it has yet been possible to imagine, is a proposition on which I suppose the minds of physicists are pretty well made up. The recent researches of Prof. Thomson and Mr. Joule, moreover, have gone a great way towards bringing into vogue, if not yet fully into acceptation, the doctrine of a more or less analogous conception of heat. When we consider now the marked influence which the different calorific states of bodies have on their affinities—the change of crystalline form affected in some by a change in temperature—the allotropic states taken on by some on exposure to heat—or the heat given out by others on their restoration from the allotropic to the ordinary form (for though I am aware that Mr. Gore considers his electro-deposited antimony to be a compound, I cannot help fancying that at all events the state in which the antimony exists in it is an allotropic one),—when, I say, we consider these facts in which heat is concerned, and compare them with the facts of photography, and with the ozonisation of oxygen by the chemical rays of the electric spark, and with the striking alterations in the chemical habitudes of bodies pointed out by Draper, Hunt, and Becquerel; and when, again, we find these carried so far that, as in the experiments of Bunsen and Roscoe, we find the amount of chemical action numerically measuring the quantity of light absorbed—it seems hardly possible not to indulge a hope that the pursuit of these strange phenomena may by degrees conduct us to a mechanical theory of chemical action itself. Even should this hope remain unrealised, the field itself is too wide to remain unexplored, and, to say nothing of discovery, the use of photography merely as a chemical test may prove very valuable, as I have myself quite recently experienced, in the evidence it has afforded me of the presence in certain solutions of a peculiar metal having many of the characters of arsenic, but differing from it in others, and strikingly contrasted with it in its powerful photographic qualities, which are of singular intensity, surpassing iodine, and almost equalling bromine."

We have pleasure in presenting our readers with abstracts of the more specific papers which have been read on the subject of photography, as the demand on our space prevents the possibility of giving these papers at length. Mr. Lyndon Smith, in a paper "On the Choice of Subjects in Photography," said:—

"It was the grand reproach thrown against photography that it was a merely mechanical operation, and that its votaries need not necessarily possess taste, imagination, or even a knowledge of the rudimentary elements of pictorial art. A writer in the last number of the *Art Journal* states that his object is to show that no mechanical process can long supersede the living agency of man's mind, and that photography is and never can be anything more than a servant of servants; and the writer attempts in a long and tedious exposition to prove by arguments neither novel nor ingenious the utter inadequacy of photography to maintain the position in which its admirers would place it. Now these remarks, he was aware, would make not the slightest impression on genuine disciples of the art, but he introduced them because adverse criticisms were in some measure merited by the ill choice of subjects the majority of photographers, both professional and amateur, often made, the former generally styling themselves photographic 'artists,' with what impropriety their specimens too often showed. However, within the last two years there had been very great improvement. The *art* in the first days of photography was totally lost sight of in the excitement

produced by the marvels of the *science*, and it is but lately that the camera has been transferred from the hands of the chemist, who has taught us indispensable knowledge, and to whom we could not be sufficiently grateful, to the hands of the artist, who now demonstrates daily the beauty and truth of its representations. The most common subjects represented have been architectural, and the French photographers have arrived at a great amount of perfection in this department, yet in even the best of their pictures there is often a want of taste in the point of view selected. They are too often taken from an elevation, to prevent the inclination upwards of the camera, (which causes the upright lines to converge), and, consequently, there is a loss of magnitude, and the beauties of perspective are diminished. Again, they are generally 'full front' instead of 'in perspective,' which latter position is always more picturesque. But it is in landscape that the glorious fidelity of the camera, when its direction is controlled by the true artist, is most evident. None but he can experience the delight of catching the most transient effects of ever-changing nature. It is in this direction that the glorious future of artistic photography lies, and the true lover of nature will delight more in a specimen of this class than in scores of hasty sketches, even by clever men, or in the gaudy and meretricious colouring of the pre-Raphaelite, vainly attempting to delineate, by the hand, that which the sun himself paints for us in the photograph with such exquisite detail. Photographers are generally too frightened of getting the sun in the camera, as they say, and take their views with its back to their best friend, and thus they lose all the cross shadows which give a stereoscopic effect to a picture, and, in fact, get hardly any shadow at all; as with the sun in the position mentioned, the shadows are all behind the different objects composing the view. He had invariably found that the most pleasing pictures were taken with the sun shining right on the front of the camera, and nearly into the lens, but in this case the precaution must be taken to shield the lens from the direct rays of the sun by the hand or otherwise. Water in motion is rarely reproduced with success, except in instantaneous views, and for the present that must be left to the painter, who, by the aid of white paint and hard brushes, can give us any amount of cataract. The painter himself even condescends to use the camera for the depiction of foliage and herbage, and photographic studies of foreground are most generally admired for the extreme delicacy with which the veinings and markings of the tenderest herb or flower are delineated; still it must not be forgotten that foregrounds are most lovely when adjuncts to an extended view. The study of composition is as necessary to the photographer as to the painter, and every student of the art may derive much benefit from the study of J. D. Harding's 'Principles and Practice of Art,' which, containing much from which many will dissent, conveys to an inquirer much useful and practical information. With reference to the latter portion of his subject, Mr. Smith mentioned that calotype paper was, in his opinion, suitable for giving bold effects, though open to objection on account of its want of clear definition and its granular surface. The wax paper was more homogeneous, but both methods are now generally exploded. Albumen on glass gave exquisite definition, and was most successfully used for taking engravings and paintings, on account of the clearness of lines and the absence of dirtiness in the white parts, a fault to which collodion is liable. In his opinion, the albumen on glass process could not be improved upon by any of the modern processes to which Mr. Ward had alluded. After all, the collodion process was undoubtedly the best, notwithstanding the inconvenience attending its use. The collodio-albumen process, so much advocated at present, appeared to him extremely unsatisfactory, though the confidence of its supporters was unbounded; and as to the dry collodion process, by it no satisfactory effects have yet been produced, though every effort had been made by its advocates. He concluded by hoping that the remarks he had made might excite discussion, that so any fallacy might be confuted, and any truth confirmed."

A letter from Mr. W. McCraw, of Edinburgh, to Sir D. Brewster, "On a new means of preventing the fading of photographs," was then read. To accomplish this object, Mr. McCraw had adopted the following formula:—

"1. Take the white of eggs and add about 25 per cent. of a saturated solution of common salt (to be well beaten up and allowed to subside). Float the paper on the albumen for 30 seconds, and hang up to dry.

"2. Make a saturated solution of bichromate of potassa, to which has been added 25 per cent. of Beaufoy's acetic acid. Float the paper on this solution for an instant, and when dry it is fit for use. This must be done in the dark room.

"3. Expose under a negative in a pressure frame in the ordinary manner, until the picture is sufficiently printed in all its details; but not over printed, as is usual with the old process. This requires not more than half the ordinary time.

"4. Immerse the picture in a vessel of water in the darkened room. The undecomposed bichromate and albumen then readily leave the light and half-tints of the picture; change the water frequently, until it comes from the prints pure and clear.

"5. Immerse the pictures now in a saturated solution of protosulphate of iron in cold water for five minutes, and again rinse well in water.

"6. Immerse the pictures again in a saturated solution of gallic acid in cold water, and the colour will immediately begin to change to a fine purple black. Allow the pictures to remain in this until the deep shadows show no appearance of the yellow bichromate. Repeat the rinsing.

"7. Immerse finally in the following mixture:—

Pyrogallic acid	2 grains.
Water	1 ounce.
Beaufoy's acetic acid	1 ounce.
Saturated solution of acetate of lead	2 drachms.

This mixture brightens up the pictures marvellously—restoring the lights that may have been partially lost in the previous part of the process—deepening the shadows, and bringing out the detail. Rinse finally in water, and the pictures are complete when dried and mounted.

"The advantages of this process may be briefly stated as follows:—First, as to its economy; bichromate of potassa at 2d. per ounce is substituted for nitrate of silver at 5s. per ounce. Secondly, photographs in this way can be produced with greater rapidity than by the old mode. Thirdly, the pictures being composed of the same materials which form the constituent parts of marking ink, it may be fairly inferred that they will last as long as the paper on which they are printed."

In our next number will be given the remainder of the papers bearing on photography, which were read before the British Association.

THE COMET.

During the months preceding March last great preparations were being made in the photographic world to take photographs of the eclipse of that orb which plays such an important part in the economy of photography. But, unfortunately, the weather prevented the possibility of obtaining anything like a satisfactory picture; indeed, nothing worth speaking of was obtained. These attempts to perpetuate the occurrence of events which occur at lengthened intervals are important, not only to contemporaneous astronomers, but likewise as records, that may be handed down for the guidance and observation of future astronomers.

It is, therefore, not a little surprising, that while photographers should have been so fully alive to the importance of taking views of the eclipse of the sun, nothing is being done at the present moment to record the visit of the brilliant long-tailed "celestial vagabond," which nightly attracts such an amount of attention, both from the scientific, and the mass. To take a view of the comet by means of photography, we are of opinion that an astronomical telescope would not be sufficient, both because the light would be too feeble, and because the field of view would be so very limited, not embracing more than about a degree, whilst the comet extends over nearly thirty degrees.

We think that a portrait combination of as large an aperture and as long a focus as could be obtained, would answer the purpose best, if means were taken to neutralise the movement consequent upon the rotation of the earth, by mounting it equatorially, and driving it by clock-work, or similar power, as in many astronomical telescopes. It is not to be expected that persons could in any moderate time fit up a camera in this way, but there are in England many telescopes mounted as above, and all that would be requisite, would be to fasten the camera on to the telescopic tube, so that it could be driven by the same machinery. At present the nucleus of the comet is as bright as a star of the first magnitude, and would probably produce an impression on a sensitive collodion plate in the fraction of a second; but many minutes' exposure would doubtless be required to obtain an impression of its tail.

ON THE CALOTYPE PROCESS.*

When they are required for the camera, the next proceeding is

To Sensitise the Sheets.—Make the aceto-nitrate solution as follows, and call this No. 1:—

30 grains nitrate of silver.
1½ drachms glacial acetic acid.
1 ounce distilled water.

One thing to be attended to here is, that the acetic acid be really the strong acid, if it is not, the whites will grow brown during the development, and so ruin the negative; owing to this cause, I could never print from my first photographic attempts, and the very first pictures I took, when I discovered this, were as good as many *exhibition pictures* of the present time.

Make a saturated solution of gallic acid in cold distilled water, and call this No. 2. Here the amateur must remember that gallic acid requires an hour or two to dissolve in water, and a great quantity of water takes up a small proportion only of gallic acid, or, to give the exact chemical language, gallic acid requires 100 parts of cold water to dissolve it, so that about five grains to an ounce is as strong as the solution can be made. Take then

1 drachm of No. 1 solution.
1 drachm of No. 2 solution.
2½ ounces distilled water.

This quantity will excite a great number of 9 × 7 sheets, which is the size, perhaps, most used. To apply this, I prefer the glass rod; pour a small quantity of the liquid on the top of the sheet, which must be placed on blotting paper, then, with the glass rod, stroke it along, and, as the liquid follows, it will be easy to spread it over the whole surface. With Turner's paper the mixture flows readily, but with Whatman's some few seconds are required to overcome a kind of greasiness which shows itself invariably on his paper. It is, however, soon overcome; and when the sheet seems well charged—which will take a minute, perhaps—blot off the remaining liquid, and place in the dark slide, or, if in a book, betwixt each sensitive sheet lay a piece of blotting paper—this is now fit for exposure. But before I describe that, let me here remark, that in some of Turner's paper there were very many metallic spots, which spoiled my pictures; after experiments, almost innumerable, to get rid of these, I added 6 or 8 drops of acetic acid to every 10 of the silver solution in the exciting solution, termed No. 1; to this, I used to add 1¾ or 2 ounces of distilled water instead of 2½; and, by this treatment, almost all of the iron spots disappeared, and the same paper (before deemed worthless) I always used with success as great as I could expect from any process. Now I return to

The Exposure.—This should not be delayed more than thirty-six hours, but it may take place even when the paper is just excited. I have obtained good pictures with sheets which had been prepared a week, but there is no certainty after the expiration of the above time. As to the time of exposure, with a lens fourteen or fifteen inch focus, diaphragm half inch, in full sunshine, it would require five or six minutes; but, of course, by less diluted sensitising liquid, the exposure may be reduced by one half the above, but its keeping quality and its certainty would be lost. Expose for the shadows, as this paper does not solarise.

Developing the Picture should not be deferred more than forty-eight hours; and, if possible, it should be done before. To accomplish this, take one part of the 30 grain aceto-nitrate solution (No. 1), and two parts saturated solution of gallic acid (No. 2), mix, and apply with glass rod, keeping the surface well and evenly covered with the mixture; from ten minutes to an hour is required to bring out the picture, but the proportions given above may be varied to suit the exposure. If the picture has been exposed a long time—as will be necessary if the shadows are very dark—use one part of No. 1, and four or five of No. 2, as the before-mentioned strength would embrown the picture. In this state the process requires the greatest care, as the blacks are dense *to the eye*, when they are far from it if examined by transmitted light. Indeed, I always develop a little more than most men, as, by this, I gain more decision and sharpness, and a little, though very little, is lost in

Fixing the Picture, which is done by steeping the negative in a solution of 1 ounce of hyposulphite of soda to 6 ounces of water, until the yellow colour disappears from the paper; this takes from five to fifteen minutes, and then it must be washed through six or eight changes of water, for twenty-four or thirty hours, to get rid of the hyposulphite of silver; when this is accomplished, dry; when thoroughly dried, lay the picture on some hot or warm surface, and rub with white wax until thoroughly saturated; then place it between blotting paper, and iron it with a hot iron, until all superfluous wax is taken from the surface. This completes the process, and the negative is now ready to be printed from.

Before closing this description, I have one thing to mention as the greatest cause of failure in the process, viz., WANT OF CLEANLINESS. The gallo-nitrate measures, &c., should be washed well, and now and then with cyanide of potassium solution. If this is attended to, I know no particular cause of failure.

Θ

* Continued from p. 38

MR. POUNCY'S CARBON PROCESS.

It will be remembered that the discussion on this subject originated in the publication by us of a translation of the process employed by MM. Garnier and Salmon for the production of carbon proofs. This was followed by a letter from Mr. Pouncy, in which he denied that his process in any way resembled that described; and subsequently by another letter, in which he proposed to submit specimens of pictures taken by his process to us for our opinion. This he has since done, and we have now before us two carbon proofs—the one a print from a photograph of a farm-house; the other, a portrait of Capt. Cook, the celebrated navigator. With respect to the first, our opinion is, on the whole, favourable; the great difficulty—the delicate rendering of the half-tints—being most successfully overcome. We could scarcely desire anything more perfect than the representation of the farm-house and the neighbouring ricks. The picture is, however, to a certain extent, disfigured by the trunks of two enormous trees, which present a somewhat blurred appearance; this, however, is more the fault of the negative, as it exists to almost an equal extent in a silver print which we have seen of the same subject. It has also a reddish tinge, which we should not have expected to find in a carbon print; but

this, Mr. Pouncy informs us, arises from his having added some red colouring matter, with the object of making it resemble more closely the appearance of an ordinary photograph. In the second picture—the portrait of Capt. Cook—the defect we have pointed out in the preceding does not exist. The portrait is, in fact, everything that could be desired; each detail is rendered with the utmost distinctness; and very few persons, we imagine, would be able to distinguish it from the original engraving from which the negative was obtained.

We must beg our readers to remember, that the opinion we have expressed refers to the pictures as such. That they are really carbon prints we do not affirm, inasmuch as we know no more of Mr. Pouncy's process than any one of our readers. The portrait of Capt. Cook certainly presents all the appearance we should have expected to find in a carbon print—more we cannot say.

In forming our opinion, we have not been influenced in the slightest degree by the extenuating circumstance urged by Mr. Pouncy—that his process has not undergone the experience of more than fifteen months—seeing that a process of this kind once discovered, can be perfected as well in fifteen months as in fifty years.

We observe that an enthusiastic contemporary has put forward a suggestion, urging photographers to subscribe £100 for the purpose of purchasing Mr. Pouncy's secret. Whether this proposition has been sanctioned by that gentleman we are not aware; we certainly think it scarcely probable, as in that case he would give up his chance of obtaining the prize of 8,000 francs offered by the Duke de Luynes, which, if we may rely on his statement, we think he has an excellent prospect of gaining.

Critical Notices.

THE PHOTOGRAPHIC EXHIBITION AT THE CRYSTAL PALACE.

CONCLUDING NOTICE.

The next person whom we have to notice in compositive photography, is Mr. Grundy, of Sutton Coldfield, near Birmingham. There is nothing new from the studio of that gentleman in the present collection. Already we have seen the whole o his productions at former exhibitions. There is a great and very perceptible difference between the style of Mr. Robinson and that of Mr. Grundy. The former, as we have shown in our last, attempts to delineate sentiment of a high class; and more or less illustrates poetic subjects. The latter chooses subjects from every-day life, and in contradistinction to Mr. Robinson, portrays the real, rather than the ideal. He is to photography what Teniers and Wilkie were to art. He portrays, as they did, those characteristics of human nature which are seen in every-day life. His most successful pictures are decidedly Dutch in feeling, and, therefore, more or less gross. By this we do not mean anything derogatory to the class of picture, any more than that Dutch pictures of the highest class never exhibit anything bordering on the ideal. We all know that even when sacred subjects are being treated by Dutch masters, the character which is sacred and holy receives the same treatment as the most profane subject would. To illustrate more fully what we mean, we may merely recall to the mind of the reader any of the pictures by the Dutch masters of "Christ insulted," and as an invariable rule, it will be found, that the figure representing the Saviour is of exactly the same type as those cruel mockers who surround him—and those are generally drunken Dutch boors. So that it will be seen that there is seldom or ever on the part of Dutch masters any very poetic flights. They are almost photographic in their transcripts of interiors, and this enables Mr. Grundy to enter fully into the spirit of Dutch composition. They never crowd their pictures with useless detail; on the contrary, everything will be found in its proper place, and an examination of the detail only heightens the interest of the beholder, by the wonderful power which they display of imitative talent. Mr. Grundy groups with a care, accuracy, and precision, which is far from painful.

By this we mean, that crowding of objects into pictures which some photographic composers seem to think the acmé of perfection, but which inspire in the mind of the beholder no more ennobling idea than would a walk through the Lowther Arcade; and which are in fact more like copies of the interior of a bazaar than anything which had been arranged so as to give artistic effect. Mr. Grundy's studies of "Fishermen" ought to be highly prized by artists, as there is such an amount of care and tact displayed in the grouping. We cannot speak so highly of his Turkish studies. They are admirable in their arrangement, and a great knowledge of the costumes of that country is shown in the pictures; but the faces are decidedly Anglo-Saxon, and this, we think, spoils the whole beauty of these pictures. Who that has seen the two *chefs-d'œuvres* entitled, "Dutch Fishermen," can withhold his admiration? They combine the greatest amount of perfection which we may reasonably expect in this department of art. There is such clearness in the tone of the picture, such true feeling in the expression of the Fisherman's face, such exquisite detail in regard to the furniture of the interior and the dress of the figure, even to the darned stockings, the wooden clogs, the stunted chairs and tables, the oval goblet, all of which strongly call to mind a copy of a picture by Teniers at his best period. The best reason which we are enabled to give for the success which attends this class of picture is, that it is taken at one view; therefore, nothing is out of drawing, and there are none of the harsh combinations which may be seen in pictures which have been made up of several pieces. The results of Mr. Grundy's endeavours are successful to a certain degree, and this we apprehend arises from the fact of his having good models.

Then we come to two or three attempts at composition which exhibit this branch of the art under the worst possible circumstances. They are entitled "The Dutch Girl on Sunday," and "The Dutch Girl on Monday." The first is a picture of a girl dressed in anti-Maccassar table covers, with no possible artistic effect; and why she should be denominated a Dutch girl at all, or if a Dutch girl, why she should represent a Dutch girl on Sunday, is certainly above our comprehension. We would advise the artist who composed the piece, to give a little more lucid information in regard to the meaning which he attempts to convey. There is certainly nothing in the countenance of the young lady that could justify the most imaginative being in thinking she was a Dutch girl. On the contrary, she has a decided look of a Somersetshire servant maid, who has, in an hour of vanity, arrayed herself in grandeur which ill becomes her. These pictures are really the most stupid compositions we have ever seen, and we think we may with safety venture to advise the artist who has perpetrated them, to retire upon the laurels he has already acquired, lest he produce something of which he shall himself be ashamed.

Dolamore and Bullock exhibit here some very fine views; we believe that they formed a part of the Kensington Exhibition; but, as far as we can recollect, they occupied positions in which we were unable to inspect them.

The views of Warwick, and of Warwick Castle, are about as fine as anything we have seen; there is a great deal of nice feeling displayed in these views; the sites are admirably chosen, and give an idea of a landscape from the best point of view. "The view across the Parterre, Guy's Cliff," is a very fine picture; the perspective is shown with great effect, while the middle tints are admirably given.

"The View of Warwick Castle" is rendered in a manner to show with the greatest possible effect the extent of this noble building. "St. Mary's Porch, Oxford," is a photograph of great beauty, and the rendering of the traceried iron work is really marvellous; the detail is finely given, while the antique sculpture is so well portrayed, as at once to attract attention. Among the minor landscapes are Mr.

B. B. Turner's beautiful talbotype pictures. We cannot help noticing the careful manner in which these pictures are printed, as well as the artistic mode in which Mr. Turner has treated all his groups of trees.

Mr. Wilson, of Aberdeen, has contributed the little gems of landscapes which he exhibited at the late exhibition. These are among the best instantaneous pictures we have yet beheld. Who that has once seen his "Thunder Cloud" can forget the truthfulness with which he has caught the electrically charged cloud, and transferred it to paper, in a manner so as at once to catch the attention of the spectator by its very reality. The views of the "Aberdeen Docks" are equally beautiful pieces of instantaneous photography; and his little picture entitled "Reach on the Don" is one of the most charming little bits of river scenery which we have ever beheld. The ripple of the Don as it flows by, is wonderfully true to nature; in fact, it looks as though the lovely stream was, in reality, gently gliding along at our feet. There are several frames here from Messrs. Ross and Thompson, studies of trees, which we think will recommend themselves to artists, as there is a great deal of botanical knowledge displayed in the selection and grouping of the pictures. Here are also three frames of small studies of landscapes by Mr. Rosling, but only the mention of these is necessary, as there is nothing in them to recommend them, either in an artistic or photographic point of view.

Next we come to Mr. Fenton's views in Wales. We think that nobody will be inclined to dispute Mr. Fenton's unrivalled claim to be the best English landscape photographer. He has succeeded in giving such breadth to his landscape pictures, that one is at first almost inclined to look upon them as copies of pictures. The selection which has been made by the Crystal Palace authorities for the Sydenham Gallery is far from being an adequate representation of Mr. Fenton, and what he can do. We miss that charming pair, the "Swallow Falls" and the "Ravine in the Lledr Valley," which were the decided gems of the South Kensington and Coventry-street Exhibitions. Those pictures deservedly ranked high as works of art, not only on account of the size, but also for the beauty of manipulation. The set of views of Wales are, we hope, but the foreshadowings of still greater efforts on the part of Mr. Fenton. The views on the continent, which were taken by Mr. Bedford at the command of her Majesty the Queen, are here exhibited again. It would indeed be superfluous on our part to do more than even mention such works as these. A verdict has been so generally pronounced in their favour, and they have so well deserved all the encomiums which have been heaped upon them, that we can only say, Go, Mr. Bedford, and charm us again in the same manner.

Having thus dismissed the question of landscape photography, we of course come to the next feature of the exhibition, viz., portraiture. We have already given an opinion upon the productions of Mr. Herbert Watkins; we will, therefore, now proceed to notice briefly the other specimens. First, then, we have to call attention to the series of contemporaneous portraits by Mayall. In regard to these pictures, they can scarcely be called photographs, inasmuch as there is nothing of the photograph left. They are sepia drawings over photography, and, in many respects, there is a decided advantage in this, because exaggerations which sometimes appear in portraits of the defective portion of the face, are toned down in these pictures. The style is peculiarly Mr. Mayall's own; and the manner of producing, in black and white, that Rembrandtish effect, is very pleasing in many instances. The series of portraits of eminent men which Mr. Mayall has collected, are now being engraved in the successive numbers of *Cassell's Illustrated Family Paper*, and no doubt they will be looked upon as highly interesting, besides the value which must attach to them as correct likenesses. Mr. T. R. Williams has the same series as he exhibited at South Kensington and Coventry-street. We think that some new specimens ought to be produced by this gentleman. He takes undoubted precedence among photographers for his untouched pictures, which are really marvellous; they are graceful and easy in attitude, and beautifully printed. But we suspect that the success which attends Mr. Williams in his photographs, arises from the fact, that he seldom or ever prints anything but the head, and in the vignette style; this accounts for the beauty of his pictures, because vignette printing has always more or less charm about it, owing to the lightness which it gives to the figure; and again, there is the absence of that unruly member—to photographers—the hand, which always will obtrude itself upon your notice, whether you will or not. The tinted pictures by Mr. Williams are remarkable for their softness of finish. Then, again, Mr. Williams's daguerreotype stereograms are something which nobody but himself can achieve. There is in them such a charming softness and beauty that they at once attract and interest the visitor; and if we are not much mistaken, the table of coloured daguerreotype portraits will prove a very attractive feature of the exhibition.

There is a series of Maull and Polyblank's portraits, possessing individuality that no one can mistake. These photographers are eminently happy in securing good expression of face, although, in many instances, the *pose* of the figures is anything but pleasing. It would be idle on our part to even enumerate a series which is so well known as this. The next which call for our attention are the carefully finished miniatures by Messrs. Lock and Whitfield. The style in which these are executed is an entire refutation of the erroneous idea that photography cannot be applied to miniature painting. The manner in which these pictures are finished reflects high credit upon the artist, although we would much rather have seen new faces; those at Sydenham are well known to us, as we have seen many of them at Manchester and elsewhere. Then, lastly, there is a frame of coloured photographs, if we remember rightly, by Messrs. Mayer, and they certainly are the greatest daubs we have seen for some time. The positions of the figures are bad in the extreme, but the Wardour-street art, which is used in painting the backgrounds, is something wonderful. In one instance we have a gentleman painted in Arabian costume (we presume), with a background which would disgrace a fifth-rate panoramic artist. It is of a fiery red, and, in the distance, we are led to believe that there is a caravan proceeding on its way to Mecca or some other pilgrim destination, and that the gentleman in the foreground has placed himself there *pro bono publico*, so as to enable the beholder to study the wonders of Eastern costume; while partly in the background is a drawing of what we imagine is meant to be a tent, but which, in reality, would more correctly represent a large glass-blowing establishment. The whole picture might indeed be considered worthy of being engraved on the head of one of those artistic, commercial invoices, in which we now and then see how admirably the engraver's artistic merits are brought forward, and what feats of imagination can be performed. This is a type of the class which adorn a frame. There is every variety of style used for background purposes,—from landscapes such as we have described, to terraces and avenues approaching baronial halls, in the most approved theatrical fashion. We should really like to have the pleasure of seeing the original photograph over which these pictures are printed, so that we might all the more thoroughly appreciate the imaginative efforts of the artist.

Having thus slightly sketched the chief characteristics of this collection of photographs, we desire to express a hope that the day is not far distant, when the present collection shall be replaced by one infinitely superior, and in every way worthy of the art and the Crystal Palace. Let the directors only see that those intrusted with the charge of this department properly discharge their duties, and we will venture to affirm that not one of the least attractive portions of this national building, and national resort, will be the photographic gallery.

Photographic Chemistry.

CHEMICAL SYMBOLS AND EQUIVALENTS.

As promised in our last, we give a list of the symbols and equivalents of those elements most commonly mentioned in photographic works :—

Aluminium	Al	=	13·7	Magnesium	Mg	=	12
Barium	Ba	=	68·5	Manganese	Mn	=	27·6
Bromine	Br	=	80	Mercury	Hg	=	100
Cadmium	Cd	=	56	Nitrogen	N	=	14
Calcium	Ca	=	20	Oxygen	O	=	8
Carbon	C	=	6	Phosphorus	P	=	32
Chlorine	Cl	=	35·5	Platinum	Pt	=	98·7
Chromium	Cr	=	26·7	Potassium	K	=	39
Copper	Cu	=	31·7	Silver	Ag	=	108·1
Fluorine	Fl	=	19	Sodium	Na	=	23
Gold	Au	=	197	Strontium	Sr	=	43·8
Hydrogen	H	=	1	Sulphur	S	=	16
Iodine	I	=	127·1	Tin	Sn	=	58
Iron	Fe	=	28	Uranium	U	=	60
Lead	Pb	=	103·7	Zinc	Zn	=	32·6

SULPHUR AND ITS COMPOUNDS.

In the last number of the "PHOTOGRAPHIC NEWS" there was an article by M. A. B. on the effect of the fumes of various substances, including sulphur, in reproducing copies of designs under certain circumstances, which we recommend to the attention of our readers as calculated to give them some examples of the chemical effects of the vapours of some of the substances we have referred to. The fumes of burning sulphur, for instance, are a compound of sulphur and oxygen, very pungent to the smell, and acid to the taste. Sulphur is a substance which is itself, as yet, little used in photography; but the contrary is the case as regards the products resulting from its combination, in different proportions, with oxygen. The first we shall refer to is *sulphurous acid*. When free from water, that is, when in the form of the fumes above mentioned, it is a gas, and would continue such under ordinary circumstances; but if it be compressed to half its bulk, or exposed to intense cold, it becomes a liquid. This liquid evaporates rapidly on being exposed to the air, and the cold produced is so great as to be capable of freezing the mercury in a thermometer. The sulphurous acid in ordinary use is formed of water which has absorbed about 35 times its bulk of the gas, the latter having a great affinity for water. Silk, wool, straw, &c., are bleached by this gas, which also discharges the colour of the red rose, and which in its liquid form is used for bleaching sponge.

The addition of oxygen to sulphurous acid produces *sulphuric acid*, the qualities of which are very different. It has not the suffocating smell of sulphurous acid, and it intensifies the colour of the red rose instead of destroying it. Sulphuric acid, in a perfectly pure and anhydrous state, is a volatile, white, solid substance. The solid acid, if dropped on paper, will burn holes in it as rapidly as a red-hot iron; and if thrown into water, causes it to hiss as if a red-hot coal had been thrown in.

Sulphur also combines with oxygen to produce *hyposulphuric*, *hyposulphurous*, and some other unimportant acids.

Sulphur combines with hydrogen in two proportions, forming *sulphuretted* and *bi-sulphuretted hydrogen*. A stream of the former passed through water coloured with a vegetable blue, reddens it. It also forms the fetid gas emitted by rotten eggs, and gives flavour to the waters of Harrowgate, Aix-la-Chapelle, &c. It is one of the most poisonous gases known: air, impregnated with it in the proportion of 1 part of this gas to 250 of common air, would kill almost any animal that breathed it.

Sulphur combines with carbon to produce *bisulphide of carbon;* 31 parts of sulphur, combined with 100 parts of cyanogen, forms *sulphide of cyanogen;* 124 parts of sulphur, combined with 100 parts of cyanogen, form *hydro-sulphocyanic acid*, the principal peculiarity of which is, that if dropped into a solution containing peroxide of iron, it changes it to a deep blood-red colour.

Chloride of sulphur may be obtained by putting a bit of sulphur into a glass flask filled with dry chlorine. It exhibits no acid properties; it decomposes water.

PHOSPHORUS.

Almost the only mode of employing phosphorus in photography is that suggested by M. Niépce de St. Victor, and referred to in the article by M. A. B. It combines with oxygen in several proportions, and has a strong affinity for water. It is of so inflammable a nature, that exposure to common air causes it to undergo a slow combustion. The fume or vapour it gives off is a combination of phosphorus with oxygen, forming *phosphorous acid*. It combines with hydrogen in different proportions, and forms a chloride, which may be obtained by passing the vapour of phosphorus through powdered corrosive sublimate, which is decomposed, and the chlorine leaves the mercury to combine with the phosphorus.

FLUORINE.

Fluorine also supplies an acid which is occasionally employed in photographic manipulations, viz., *hydrofluoric acid*. When pure, it is so volatile that it is confined with great difficulty, and, when exposed to the atmosphere, gives off fumes of an acid and suffocating nature. Its density is increased by the addition of water, though the latter is a lighter liquid. Vegetable blues are reddened by its action. It also possesses the property, peculiar to itself, of decomposing flint glass, for which reason it has been made available for etching on glass, the mode of operation being, to a certain extent, similar to that pursued in heliographic printing. The glass being coated with a varnish insoluble in the acid—one formed of turpentine and wax will be found effective—the etching is made by cutting through the dry varnish with a fine point down to the glass; a wall of wax is then raised round the plate, and dilute hydrofluoric acid poured on. A few minutes suffice for the acid to eat into the glass, which may then be immersed in water. On the varnish being removed, the design will be found to have been produced with perfect exactness.

(To be continued.)

Dictionary of Photography.

ACCUMULATION IN DEVELOPMENT.—A very faint collodion picture in which all the details are visible, but with little or no intensity when looked through, may often be converted into a vigorous negative by a

method of accumulating silver on that which is already precipitated.

The picture must be fixed either with hyposulphite of soda or cyanide of potassium, and well washed. If now a mixture of the ordinary pyrogallic acid developing solution and nitrate of silver is poured over the plate, the nascent silver will precipitate on that which is already there forming the picture, and the result will be an increase of density, which, in a short time, will be sufficient to allow of vigorous positives being printed from the plate. One of the most remarkable points connected with this method of accumulation is, that white light is not injurious to the result; in fact, the pictures seem to be intensified just as rapidly and effectually when the redevelopment is effected in full daylight, as when in a darkened room; the only objection being the more rapid decomposition of the developing solution. By well washing off the developing solution when it has ceased to act, and pouring on a fresh mixture, the deposit of silver may be so raised above the surface of the plate, as to admit of an electrotype being taken from it, and this used for printing from in ordinary printer's ink. We have succeeded in obtaining copies from line engravings in this way; the lined surface of the negative being very favourable to the accumulation of silver, in the form best adapted to produce a deeply marked copper plate, possessing excellent qualities for taking the ink, and giving good impressions.

Acetic Acid.—This acid is composed of 4 parts carbon, 4 parts hydrogen, and 4 parts oxygen. It occurs in nature in the juice of many trees, sometimes in the free state, and at others in combination with potassa or lime. There are two principal ways by which it is formed in commerce:—

1st. By the dry distillation of vegetable matter, such as wood.

2nd. By fermentation.

According to the first method the wood is placed in immense iron retorts, and heated by furnaces until it is converted into charcoal, and the vapours which it evolves are condensed. The crude *wood vinegar* thus obtained, requires to be separated from the wood tar with which it is contaminated. This is effected by rectifying it, and subsequently saturating with lime. The crude acetate of lime thus formed, after being submitted to several purifications, is then distilled with a stronger acid, when commercial wood vinegar is produced.

Wine or beer vinegar is obtained when wine, cider, beer, or dilute alcohol is exposed for some time to the air under favourable circumstances. In some manufactories lofty brick towers are erected, with side openings to admit of a free passage of air. The building is now filled with large faggots, and a slow stream of dilute alcohol is allowed to trickle on to them from the top of the tower: this, in percolating to the bottom through the innumerable twigs and branches, meets and combines with atmospheric oxygen, which has free access to it on all sides, and by the time it has reached the reservoir at the bottom, is entirely converted into vinegar. The crude vinegar obtained by either of these plans contains, besides acetic acid, a large quantity of water; frequently, also, unchanged alcohol, cream of tartar, and other salts, gum, colouring matter, tannin, ferment, &c. It is far too impure to be used in photographic operations. It is purified by saturating it with either potassa, soda, lime, or oxide of lead, evaporating until the acetate remains either in the state of concentrated solution, or of crystals, or of a dry mass, and distilling the residue with more or less of dilute sulphuric acid. *Concentrated vinegar* is thus obtained, which, although not sufficiently pure to be used indiscriminately in all photographic operations, may nevertheless occasionally replace the more expensive glacial acetic acid, especially in the developing solution for collodion.

(To be continued.)

A Catechism of Photography.

IV.—GENERAL PRINCIPLES OF PHOTOGRAPHY.

(Continued.)

Q. Is there any simple experiment by which we may learn what takes place in the production of a photographic proof?

A. There is: if some nitrate of silver be placed in a glass, and a few drops of salt and water be added, a white precipitate is formed which is chloride of silver. This is a preparation sensitive to light.

Q. How may this be ascertained?

A. The precipitate if exposed to the light for a few moments changes rapidly from white to violet, and even to black. This decomposition of the chloride of silver corresponds exactly to the formation of the photographic picture on the sensitive plate or paper.

Q. What effect is produced by the application of hyposulphite of soda?

A. If a solution of hyposulphite of soda, after the precipitate has undergone the change already mentioned, be poured upon the precipitate, it partly disappears, there only remaining some blackish particles, namely, those which have been decomposed by the light. The unchanged particles of the precipitate are dissolved by the hyposulphite of soda. This operation corresponds exactly to the *fixing*, as it is called, of the photographic picture. The entire experiment represents the process of obtaining a *positive proof.*

Q. Are there any other simple experiments which illustrate the power and action of the photographic agents?

A. If (screened from the presence of light) a solution of nitrate of silver be poured into two glasses, and a few drops of a solution of iodide of potassium be added, a yellow precipitate of iodide of potassium is produced. If one of these glasses then be exposed to the light, and afterwards taken again into the darkened room,* no apparent change will have taken place. But if a few drops of gallic acid be poured into each of the glasses, the contents of that which has been exposed to the light will blacken rapidly, while in the other, the liquid will retain its yellow appearance.

Q. How is this explained?

A. By the action of light. In one case the light has been permitted to act on the iodine of silver, and the gallic acid combined with the excess of nitrate of silver blackens the iodine, and renders the change obvious. A few drops of hyposulphite of soda will "fix" the precipitate as in the former experiments.

Q. What are we to learn from these experiments?

A. All the phenomena exhibited in photography. Positive and negative impressions upon plates or paper are all founded on these phenomena. They are simply modifications to which certain salts of silver are subjected by the action of light; so that the reducing agent mixed with nitrate of silver blackens more or less the parts affected by the light.

Q. Is the action of light upon chemically sensitive surfaces perfectly understood?

* When we speak of a darkened room, it should be understood that we refer to a room from which the chemical rays of light only are excluded.

A. The chemical study of photography is not yet sufficiently complete for us authoritatively to lay down any general theory. Sufficient, however, is known to enable us to examine doubtful points, and test apparent contradictions, and thus remove many obstacles to our scientific advancement.

Q. What is the fundamental principle of photography?

A. That the production of photographic effects is due to the action of light, and as we have already noticed, that this action is under certain circumstances capable of producing a perfect picture, while under other circumstances its action is only partial, and a subsequent process necessary for its completion.

Q. In what way do you explain the first phenomenon?

A. Chemistry shows us that light produces upon certain substances, in fact upon almost all, an analogous effect to that of heat. At one time it facilitates the combination of different elements. At another, it hastens the separation of combined elements. It is this double influence which it exercises in photography. Thus it facilitates the combination of oxygen with certain organic matters, as bitumen and resin.

Q. By whom was this property of light ascertained?

A. It was shown by the researches of Nièpce, with bitumen of Judea, and by those of M. Chevreul, and M. Nièpce de St. Victor, who have shown that resins oxidise under the influence of light. It is from this fact, namely, the oxidation produced by light, that photographic pictures are obtained.

(To be continued.)

Correspondence.

ECONOMISING THE WATER IN OUT-DOOR PHOTOGRAPHY.

No. 19, *Marine-terrace, Penzance,*
October 1*st*, 1858.

Sir,—I observe, in your last number, a letter inquiring for the minimum quantity of water that can be carried on a day's photographic excursion, and to answer effectually the end required.

I have much pleasure in forwarding you the result of my experience for the four past years, during which period I have found, for a day's work, a *pint* supply all my requirements, and enabling me, as I have done scores of times, to bring home, and *safely* preserve, eight negatives, measuring $8\frac{1}{2} \times 6\frac{1}{2}$ inches, and twelve stereoscopic negatives of the usual size. My mode of proceeding is simple enough. I use, and with unvarying success and comfort, an Archer's camera, which contains a wooden water-tight bath, holding barely 16 ounces of water. I, of course, develop *in* the camera; and, after having so done, I plunge the plate into the *water bath*, leaving it for a couple of minutes, and then carrying it out into open daylight, place it in my plate box —of *Archer's construction*—and in which the plates are placed so *close* to each other, that, on returning home from a long day's work (say the first negative having been taken at 10 a.m. and not fixed with the hyposulphite till 10 p.m.), I have never yet had any difficulty, with ordinary care, in being able to clear the negative of the iodide, and leave the film uninjured. The close proximity of the plates to each other keeps them so moist, that when, in the ordinary plate box, the peeling off of the film would inevitably occur, the occurrence of such an accident is rarely met with in the boxes made on Mr. Archer's plan; they are much more portable, in my opinion much safer for a journey, and at half the price of those generally in use. I have now worked for nearly four seasons with an Archer's camera, and find it unexceptionably the best to meet *every* requirement for out-door work. I excite and develop, both the large plates and the plates for my stereoscopic camera, inside it. I seek no dark room—no tent—and am able, of course, before leaving the spot on which I am taking my view, to ascertain if it be good or not. I have this summer taken upwards of three hundred good negatives, and for some of them I have had to travel many a long mile; and, to have returned, as many do, and found all my day's work abortive—and as, before using the camera I now employ, I have often done—would be vexatious enough to deter many a beginner from further prosecuting this most fascinating pursuit.

I consider the minimum quantity of water that can be used with advantage on a day's work, bringing home a dozen negatives, $8\frac{1}{2} \times 6\frac{1}{2}$, and an equal number of the usual sized stereoscopic plates, to be from 10 to 16 ounces, if used in the mode I have attempted to describe.

I shall be most happy to give any further explanation on the subject if any of your readers wish for the same.

I am, sir, truly yours,
J. W. G. Gutch.

TO TRANSFER GLASS POSITIVES TO GLAZED LEATHER OR CLOTH.

Sir,—If you think the following worth inserting in the "Photographic News" it is at your service.

First, cut your leather or cloth a little larger than your glass positives, lay its face upon a table, then take about $\frac{1}{2}$ oz. of spirits of wine, and add about 4 or 5 drops of nitric acid; shake up, and it is fit for use. Take the positive, after being dried by the fire or otherwise, and pour the mixture of spirits of wine on as for collodion, and when still wet lay it on the leather or cloth, face down, gently squeezing out the air bubbles, and keep them in contact either in the pressure frame or in a book, or any convenient place, until the spirits of wine is dry, which may be half an hour or so; then take out the picture, and separate the glass from the leather or cloth, and the film will be so fixed to the black surface that you cannot even scratch it with the finger nails. It may be well to use collodion a little thicker in cotton for transfers.

The above is a sure, certain, cheap, and easy method of manipulation.

Further information will be given to any one sending a stamped envelope to

John Ostell,
80, Castle-street, Carlisle.

ARTIFICIAL LIGHT FOR PHOTOGRAPHIC PURPOSES.

Sir,—To amateur photographers, who, like myself, are able to give but little time to copying subjects, and can rarely choose the most favourable moments, the possession of a powerful, steady, and cheap artificial light would be a matter of great importance. To artists also, such an accessory would be very acceptable, I should imagine. In the *Illustrated London News* of the 21st July last, a new light, stated to be the invention of Colonel Fitz Maurice, was there described, and would seem to be just the thing wanted for photography. I have made several efforts to obtain information on this subject, but hitherto have not succeeded in ascertaining whether this valuable discovery can be procured, or whether any patent is in process of being taken out for it. Under these circumstances, any information you can procure will, I think, be very acceptable to your readers, and I trust the subject will be considered worthy of your early attention.

Subscriber.

[We shall be pleased to have further information on this subject, if any of our correspondents can favour us.]

OBTAINING STRONGLY PRINTING NEGATIVES FROM FAINT GLASS POSITIVES.

Brighton.

Sir,—Having perused with interest the few numbers as yet published of the "Photographic News," and noticed your answers to various inquiries, I am induced to trouble you with this note.

In your last number, page 46, your correspondent C. P. S. states, that he has succeeded in intensifying a very weak negative, by first taking a transparent positive on glass, and from that a second negative, in which he was able to procure sufficient density in the dark parts.

If from a positive on glass a negative sufficiently intense to print can thus be taken, *without loss of the sharpness required*, it strikes me it would be a great boon to amateur, if not to professional photographers.

Mammas are always anxious to have likenesses taken of their youngest children,—and as there is no keeping the little urchins quiet, it is a severe trial to the patience of the photographer,—and a successful portrait of a child is seldom seen unless touched up by an artist. With positives it is a much easier matter, and a pleasing smile on a child's face may not unfrequently be caught in one second's exposure.

If your correspondent, or you yourself, could explain the best method of taking the transparent copies on glass, it would be highly appreciated by myself, and other amateurs.

JOB THE PHOTOGRAPHER.

[May we beg the favour of C. P. S.'s kind attention to the request contained in this letter.—ED.]

TO CLEAN A GLASS PLATE.

DEAR SIR,—It may perhaps be useful to some of your readers to know, that old collodion which is unfit for photographic work, is a first-rate material for cleaning glass plates.

The method I have adopted, is to take a small tuft of cotton wool, pour a few drops on the glass plate and rub till nearly dry in a circular direction, then finish with a wash leather.

P. H. C.

Miscellaneous.

PHOTOGRAPHY AND ARCHÆOLOGY.—Mention was made some months back, says the *Journal de Constantinople*, of the mission which M. de Sevastianof, councillor of the Emperor of Russia, had undertaken for the purpose of investigating the curiosities of antiquity contained in the convents of Mount Athos. That spot is stated to be an almost inexhaustible mine of ancient records, and has always been a great point of attraction for artists and scientific men. All those little priories which, from the summit of the holy mountain, overlook the distant isles of the Archipelago, are so many libraries where the monks have been storing up the annals of ages. Materials for history are to be found there in all languages and on all subjects, piled up pellmell, but nevertheless preserved with care by those in whose custody they are placed. M. de Sevastianof has free access to those treasures. The daguerreotype gives him hundreds of copies of the manuscripts, which he takes page by page. Already one-third of the Gospels have been copied, and numerous collections of illuminated maps and pictures have been made. They are in Greek, Sclavonian, and Georgian. Even the outside of the albums which inclose the collections have been copied, and the Byzantine reliefs on their covers have been reproduced. Moulds of them have likewise been taken in gutta percha. Thanks to the co-operation of M. Vaudin, a French painter, the frescoes in the chapels have been copied in the most exact manner. These drawings remind one of the productions of the first Italian painters, Margaritone, Oreagna, Cimabue, Giotto, Angelo de Fiesole, and Pietro Perugino. The example of M. de Sevastianof has found imitators, for already other photographers have arrived on Mount Athos, not to compete with him, but to emulate his zeal. The harvest is abundant, and the sooner artists apply themselves to the task, the sooner will these masterpieces, which were considered as lost, undergo an unhoped for resurrection.

PHOTOGRAPHIC IDENTIFICATION OF STOLEN FRUIT.—A correspondent of our contemporary, "Notes and Queries," writes:—"While the fruit, peach, nectarine, or apricot is yet in a green state affix an adhesive *label*, your initial, or any other private mark to the side exposed to the sun. The *ripe* fruit thus labelled will carry its unobliterated *green* stamp into any market. This simple operation, if it should fail to *preserve* the fruit, will, unless it should have been subjected to any colouring process, at least enable the owner to *identify* it."

Photographic Notes and Queries.

DIFFICULTIES IN THE COLLODION PROCESS.—PAPER FOR THE CALOTYPE PROCESS.—PIN-HOLES IN COLLODION PICTURES.

MR. EDITOR,—Having seen that you kindly undertake to answer questions on photography, through the medium of the "PHOTOGRAPHIC NEWS," I beg now to point out to you some difficulties I have met with.

In the positive collodion process, I found the way smooth enough, but I cannot say I have been so lucky in the negative process on glass. I succeeded several times in obtaining good negatives, but as soon as I poured on the fixing solution I was disappointed, obtaining a bad positive instead of a negative. My solutions used were—American collodion excited in a 40 grains neutral bath, and developed with 1½ grains pyrogallic acid, 8 drops glacial acetic acid, 10 alcohol, 5 and 6 drops of nitrate of silver solution, and 1 oz. distilled water, and fixed with hyposulphite of soda.

I tried to take some calotype pictures; used Canson's paper, soaked it on one side in a solution of silver, then iodised in iodide of potassium, and lastly brushed over with a 50 grain aceto-nitrate of silver bath, and gallic acid solution in equal parts; and then what invariably took place was, that the paper began to cover itself with brown patches, and therefore became quite useless.

I have got some collodion which is slow, and gives a rather brown colour to the pictures. I believe the second fault is to be attributed to some bromine that I put in it. Is there anything for these two faults?

Very often I find my pictures dreadfully covered with pin-holes. Can that be attributable to the presence of too much iodide of silver? If so, why do I not always meet with this annoyance, which I could not attribute even to an impure bath, as it took place sometimes in spite of a careful filtering?

I hope you will excuse me for having asked so many questions at once, but trust in your kindness to be gratified with a reply, and thanking you in advance,

I remain, sir, yours respectfully,

G. M. F.

[1. We have occasionally met with a similar occurrence, and attribute it to not having developed the picture long enough. We do not know the kind of collodion mentioned, but when there is a large quantity of iodide in it, so that the film is a thick one, the operator is frequently deceived as to the intensity of the negative, the density of the iodide of silver making the picture appear sufficiently developed for a negative, when in reality it is not near dark enough. On pouring on the fixing solution the iodide of silver dissolves away, and leaves the picture in its real half developed state. Try the method of re-development after fixing and *well* washing; it may improve the pictures, but in future develop much further.

2. It is next to impossible to take calotype negatives on French paper: the material with which the paper is sized has a very marked influence on the process, and the starch, which is the sizing material of foreign papers, causes the paper to turn brown on developing. English paper makers employ gelatine, or some similar body, as a size, and that seems to suit the calotype process very well. There is great difficulty in obtaining good paper for this purpose. We prefer Turner's, and but for the spots with which that make of paper is so plentifully supplied it would be perfect.

3. We fear your collodion is useless. Try if adding a few zinc filings will remedy it.

4. *Pin-holes* are a rather common source of annoy-

ance in the collodion process; a frequent cause is dust in the collodion or bath. Too much iodide of silver in the bath may also cause it. The remedy for the latter is the addition of a few ounces of a 30 grain solution of nitrate of silver to the bath. As, however, you say that you only occasionally meet with this fault, and that even after carefully filtering, we are at a loss to divine the cause.]

WORKING WITH A TWIN STEREOSCOPIC CAMERA.—THICK STREAK ON A COLLODION PLATE.—TO ASCERTAIN THE AMOUNT OF SILVER IN THE NITRATE BATH.

SIR,—Can you oblige me, through the medium of your journal, by informing me of the proper method of using a *double* camera so as to obtain the proper stereoscopic effect? a feat which I have hitherto been unable to accomplish. The camera is one with an adjusting screw between the two lenses for the purpose of separating them more fully at pleasure.

Can you at the same time inform me how to obviate, by manipulation or otherwise, the thick *streak* of collodion I invariably get at the bottom of a plate after coating it with collodion? And is there any method of ascertaining the amount of silver in the bath with any degree of certainty?

Feeling sure that your publication is exactly the one wanted by *all*,

Believe me, sir, your sincere well-wisher,

N. E. F.

[1. It must always be borne in mind, that when the two pictures are taken simultaneously on the same plate, the two halves will require to be transposed, that is, the picture which is at present on the right of the plate must become the left picture, and *vice versa*. Most likely N. E. F. has not attended to this rule, and has seen the pictures *pseudoscopic* instead of *stereoscopic*.

2. The fault mentioned can be avoided by using a thinner collodion, pouring on and off quicker, and *rocking* the plate more whilst draining. We cannot explain the manipulation better, but if you watch any good operator you cannot fail to see what we mean.

3. The amount of nitrate of silver present in a solution may be very conveniently ascertained, and that with quite sufficient accuracy for all ordinary purposes in the following manner:—

Prepare a solution of 32 grains of pure chloride of ammonium in 12 ounces of water; 1 drachm of this solution will therefore precipitate 1 grain of nitrate of silver. Measure out very carefully a known quantity of the bath to be tested (2 drachms for instance), place it in a 2 ounce phial, and add a few drops of nitric acid. Now measure out exactly 1 drachm of the solution of chloride of ammonium, and add it, by a few drops at a time, to the silver solution in the bottle, corking it up and shaking violently between each addition, until a white precipitate is no longer produced on the addition of another drop of the test solution. If before this is accomplished, the first drachm of test solution be exhausted. carefully measure out a second drachm, and so on until the desired point is reached. When finished, the number of drachms of test solution used will indicate the number of grains present *in the phial*. Thus, supposing 2 drachms of the nitrate bath had been placed in the phial, and it required 7½ drachms of test solution to precipitate the silver, that would have shown that the two drachms of bath contained 7½ grains of nitrate of silver, or 30 grains to the ounce.

SOAKING THROUGH OF THE BLACK VARNISH FOR POSITIVES.

SIR,—Will you favour me in your next number with an answer to the following question?—Ought a collodion positive on glass to fade after being *well washed* (by a stream from a small glass siphon for a quarter of an hour), varnished with crystal varnish, and then backed by Indian ink, or if such should fade, can you tell me the cause?

My reason for asking the above is, that having taken several of my friends, I have two or three that have gone off all black. The fault cannot lie in the washing, I think; and, as I have a great many that I have taken varnished with spirit varnish, and backed in the same way quite unchanged, I think the fault must lie in the varnish. I ought to say that they have not gone off in the same way that I have seen some from imperfect washing. These go off in small specks and holes in the reduced silver first; but mine have gone gradually, just like dissolving anything in a fluid.

What would you advise as the best backing for glass positives? W. W.

[The cause of the above fault is the black varnish gradually soaking through the film, and thus darkening the picture. We have always found the remedy to be in coating the picture first with a colourless varnish, and then with a black varnish prepared with a solvent that would not dissolve the first coating of clear varnish.

We have adopted the following plan with great success:—pour over the collodion side of the plate, either when wet from the last washing, or when quite dry, perfectly liquid albumen (obtained by beating to a froth, and collecting the liquid after subsidence); after pouring it on and off a few times, put the plate against a wall to dry. When perfectly dry coat with black varnish. For this purpose we employ the *best black japan* used by coach makers, applied thick, and dried in a horizontal position by gentle heat. We have also used printer's ink with great success, and would recommend it to the favourable notice of all those who are in want of a good black backing for positives.]

QUERIES ON LENSES.—LEGALITY OF SUNDAY PHOTOGRAPHY.

Gullane.

MR. EDITOR,—I am glad to see by the newspapers that photographers are likely to have a new and powerful advocate—a worthy exponent of their art! and I am right glad that you intend to give, in the "PHOTOGRAPHIC NEWS," *immediate* answers to your correspondents' questions. I know, and *you* seem to feel, that delay in this matter destroys the interest and advantage of the information. —"*Bis dat, qui cito dat.*"

Will you oblige me by telling me, first, which lens (a landscape lens or a portrait lens) would you recommend me to use for taking views of houses, &c.? Secondly. Is it unlawful to work as a photographer for hire on Sundays?

I am, yours truly,

M. LUGTON.

[1. If intended merely for architectural or similar objects, where the subject is nearly on one plane, a portrait lens may be used with advantage, if you already possess one, as with a moderate aperture (about one half or one third of the full aperture) very excellent and sharp pictures may be obtained in a very short time; but in purchasing one for such a purpose we recommend a landscape lens, as the picture produced is quite as perfect, if not more so, and the price very much less—the only drawback being the increased time necessary to be given during exposure.

2. We do not quite understand your second question. Do you wish us to state whether we think it is a breach of the fourth commandment to work on Sundays, or do you merely wish us to give you the law that bears on the point? As a legal question, there is an act of parliament expressly against working *for hire* on Sundays, although few magistrates care to enforce it. A photographer was summoned before a magistrate some time since for "*following his usual business on Sunday*," and only escaped punishment by proving that he was not carrying on his *usual* business, as he worked as a tailor all the week, and that photography was therefore an *unusual* occupation for him.]

M. GAUMÉ'S PAPER-GLASS.

SIR,—Being anxious to make some paper-glass according to M. Gaumé, I took 3 oz. of the sheet gutta percha, such as surgeons use for splints, and dissolved this in 6 oz. of benzol, that is 50 parts to 100. This solution was of the consistence of ordinary treacle or honey; to this I added 3 oz. more of benzol, thus reducing the gutta percha to 33 parts in 100. This brought it to the consistence of ordinary syrup. Into this fluid placed in a porcelain dish, I plunged a sheet of paper, passing it beneath a glass rod for the purpose of submerging it; the end first introduced was then seized and steadily withdrawn; the fluid as it rolled down the paper, thickened in streaky lines, and the drops which fell from it on the surface of the fluid, so remained, floating white like drops of candle grease. It occurred to me that perhaps M. Gaumé's formula is 4 or 5 parts of gutta percha to the 100, instead of 40 or 50, as stated in your second number. I inclose the result of my proceeding after subsequently exposing it to the heat of the fire. The paper I employed was the thin negative paper.

J. C.

[In repeating the experiments of M. Gaumé (vol i. p. 16), we have found, like our correspondent, that the strength there given is too strong. We have succeeded best when the original solution was diluted with 4 times its bulk of benzol. Our correspondent will also find it advantageous to employ a plate glass cover for the dish, and to draw the sheet between the edges of the dish and cover, so that the excess of solution may be scraped off each side of the paper.]

OBTAINING NEGATIVES WITH POSITIVE COLLODION.

SIR,—Can you inform me of a developing solution that will bring out a good negative upon a plate prepared for a positive picture?

Yours most respectfully,

M. B.

[Of course it will not be so easy to take good negatives with positive collodion as when the collodion is expressly prepared for negatives; but by attending to the following plan our correspondent will be able to produce tolerably good ones. Prepare, expose, and develop the picture as if for a positive, only continue the development longer, until the detail in the shadows is well out, and the picture decidedly overdone for a good positive. Then wash the developing solution well off, and re-develop with the negative pyroxyline developer, adding to it a few drops ot the silver bath, as the development seems to require it. The picture will increase in intensity until it becomes a negative, when fix, &c., as usual.]

BISECTING A LENS FOR STEREOSCOPIC PURPOSES.

SIR,—You would oblige by saying, through the medium of the "PHOTOGRAPHIC NEWS," whether it would be possible to cut an *achromatic* lens in *two* so as to form two twin lenses for the stereoscopic camera; and the method of doing it. I fancy both pictures would be equally *exposed*, and equally focussed, thereby producing better pictures, providing development being properly attended to.

M. N.

[There would be no difficulty in cutting an achromatic lens in two, as it is frequently done for astronomical purposes, when lenses worth some hundreds of pounds are thus treated. But it would not be possible to obtain as perfect an image with one of the halves, as with an entire lens; besides which, the "stop" could not be placed at the proper point opposite the centre of the lens. Lenses are now ground *in pairs* for stereoscopic purposes, and thus absolute identity of effect is secured.]

ANSWERS TO MINOR QUERIES.

GOLD-COLOURED STAINS ON ALBUMENISED POSITIVE PRINTS.—CHLORIDES FOR PRINTING ON PLAIN PAPER.—*Tewkesbury* asks the cause of—First, long yellow metallic lines, and circles of the same colour, which are so frequently to be met with on removing the print from the printing frame, and which are still apparent after toning and washing. Canson's, and Papier Rive, are both affected with them, and Tewkesbury hardly ever gets a print faultless in this respect. Secondly, which chlorides are best adapted for preparing plain paper—chloride of ammonium, barium, or sodium?—1. The stains referred to are frequently met with in positives on albumenised paper. A little care in attending to the following points will obviate them. Use quite fresh eggs, and take care that the prepared albumen does not contain any opaque stringy particles suspended in it. The paper must also be lowered on to the surface by means of a steady, continuous movement. Any stoppages in this operation will produce bronzed lines across the paper. Carefully examine the surface of the albumen in the bath after each sheet has been removed from it, and if any scum appears on the surface of the liquid, remove it by drawing a piece of paper gently over the surface, before laying down the next sheet. Be careful also that the quantity of albumen in the bath be sufficient to prevent the sheet from touching the bottom. 2. It matters little what chloride be employed, provided the proportion be such that the bath contains the proper quantity of chlorine. The chemical reaction which takes place between the chloride used in the first preparation of the paper, and the nitrate of silver used in rendering it sensitive, is to produce a *chloride of silver* in the pores of the paper, which is the real photographic agent, and a nitrate of whatever base has been used in the first bath, be it ammonium, barium, or sodium. This nitrate is perfectly soluble in water, and consequently dissolves out into the silver bath whilst the sheet is being made sensitive, and we do not believe it has the slightest direct influence on the result. It may possibly slightly influence the picture in an indirect way, owing to the accumulation of the foreign nitrate in the silver bath, which might thus, in the case of nitrate of soda, for instance, tend to give a deliquescent film on the sensitive paper. Or from the chemical affinities of the base in question,—thus, chloride of barium as a salting bath would tend to convert any sulphates in the paper to the state of sulphate of baryta, which is, as far as present experience shows us, perfectly harmless in a photographic point of view.

RECOVERY OF SILVER FROM OLD NITRATE BATHS.—*W.D.* asks if it is necessary to purify the silver in any way after having recovered it from old baths by means of zinc or copper. When silver is precipitated from a solution of its nitrate by means of zinc, the resulting metallic silver is liable to contain slight traces of the former metal, together with all the impurities with which it may be contaminated. It is a difficult matter for any but an experienced chemist, to separate small traces of zinc from silver, and consequently, we do not recommend this plan

so much as the employment of metallic copper. The copper should be cleaned quite bright when immersed in the bath, and the latter should also be clear and kept well covered during the operation. The action should be allowed to continue for twenty-four hours, and it will be found a material assistance if the vessel containing the mixture be in a warm place. The resulting precipitate, which may be removed from the copper by gentle friction with the finger, must be filtered from the blue solution (nitrate of copper), and washed once or twice with very weak ammonia water, and lastly with pure water, until a drop of the liquid as it comes from the funnel, received upon reddened litmus paper, does not restore the blue colour of it; the precipitate when dry will be pure metallic silver. We recommend the above plan for recovering the silver from old baths, in preference to the method of precipitating it with chloride of sodium, as the *nascent* chloride of silver is liable to carry down with it impurities from the organic matter which has accumulated in the bath.

Substitute for Glass for Collodion Positives.—*E. M.* asks for the best substitute for glass for taking portraits to put into lockets, which will cut to shape after the likeness is taken. Either patent calf leather, or the enamelled iron tablets which have been lately introduced in England. We have seen some very good pictures on these latter.

Varnish for Paper Stereograms.—*J. L.* and *Z.* ask how stereoscopic and other positive prints are varnished. Gum arabic dissolved in water is the most usual glaze for such pictures; but there is also another kind in use, which gives a surface similar to French polish, the preparation of which is, however, kept a secret. (For *J. L.'s* other query, see vol. i. p. 20.)

To Restore the Sensitiveness of Old Collodion.—*T. H. S.* has a quantity of old collodion which has lost its sensitiveness through age, and has become the colour of light port wine. The sensitiveness may be in great measure restored by putting some strips of perfectly clean and pure zinc or cadmium into the bottle, and allowing them to remain in contact, with occasional agitation, until the colour has gone.

TO CORRESPONDENTS.

A Poor Artist.—It will not be difficult to get up sufficient photographic knowledge to be able to produce pictures quite good enough to form the ground work of a painting. In fact, you would be far more likely to paint a correct likeness over a faint out-of-focus print on plain salted paper, provided you have half an hour's sitting to assist you, than if you had relied entirely on the most highly finished photographic portrait. Our remarks did not apply to those who merely intended to use photography as a *means* to an end, but to those who regarded it as *the* end.

Excelsior.—The portrait has been much over printed, and the developing solution poured on the plate too much in one spot, consequently the development has not been uniform. Your toning bath is too old, and out of order now; you had better make a new one. See the article on the subject in a recent number of the "News."

Albert.—See answer to "An Apprentice," vol. i. p. 12. Of your two lenses, the plano-convex lens 7½ inches focus would be better than the biconvex lens of 3 inches focus; the plain side should be turned towards the object to be copied.

R. A.—A white background; it may be made of canvas and coloured afterwards. Rain water is not quite so good as distilled water.

P. H. C.—A separate toning and fixing bath will suit you best.

F. W. H.—Before we can give any advice on the subject, you must favour us with further particulars on the subject of your new discovery.

M. A. H.—A better process has recently appeared in our columns. Albumenised paper may be obtained ready prepared: consult our advertising columns. The toning should be performed in the dark. We do not know any particular material 9 feet wide suitable for a background; we think that there are many of that width.

T. T.—We are obliged by our correspondent's kind note. Orders for former numbers must be given immediately, as they are nearly out of print. It will be nearly impossible to obtain satisfactory copies of anything but engravings by means of gas-light.

J. T.—The details you ask for will be at once found out when you follow the instructions already given.

J. J. L.—Fasten the photograph against a wall in a good light, and place the camera opposite, at such a distance that the image is the desired size on the ground glass.

H. F. T.—We are obliged for the information, but, at the same time, do not think it would answer the purpose sufficiently well to be of interest to our readers.

Amateur.—Fused nitrate, with 2 drops of acetic acid to the ounce of solution. Bromide, chloride, and iodide of cadmium can be sent through the post with safety. You had better use what was recommended, and order the salt from some London house; see advertisements.

R. W. T.—1, and 3. We cannot undertake to say which of the dry processes is "the easiest, most portable, and surest for taking stereoscopic pictures:" so much depends upon the experimentalist's own skill. 2. Yes. 4. The question is hardly a fair one to ask us to answer.

T. Mc.—"has a bath with an excess of both acid and alkali in it," and wishes to know how to remove the excess. This is a chemical impossibility; there can only be an excess of *one*, and cautious addition of the *other* will remove the excess. Is it alkaline or acid? if the former, add acid; if the latter, add alkali.

D. W.—You will not do much good with such a lens. The picture is deficient in half tone; for a remedy see recent numbers.

W. S. P.—Your former letter has been received, and will meet with due attention.

A Manx Amateur.—We cannot give the information clearer than we have already done; the order of manipulation is correct; and the formulæ for solutions are also given. The information was not intended for those who had never attempted anything of the sort before, as they would not be in possession of sufficient experience to be able to profit by it. Chloride of gold will keep in aqueous solution for any time.

C. S. J.—Your collodion is not good; try the formula at vol. i. p. 35. Bicarbonate of potassa will not do for correcting the acidity of the bath so well as carbonate. You received your number of the "Photographic News" without the four inside pages; they contain the articles mentioned in the "Contents." You can at once have the deficiency supplied by mentioning the circumstance to the agent through whom you obtained the "News," or on application to the publishers.

An Amateur.—Salt and chloride of sodium are the same thing; the former is usually applied to the commercial article, and the latter to the pure chemical compound Na. Cl.

J. Thompson.—The "Photographic News" may be obtained direct from the publishers; if you have any difficulty in obtaining it in your village, you would then receive it by the first post on Saturday morning.

A. O.—V. L.—Smith.—Pyro.—X. Y. Z.—A Subscriber.—Our correspondents will see that it is out of our power to save them the trouble which is indispensable in mastering the principles of any science.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—G. G. S. J.—W. H.—F. D. (you had better advertise for negatives).—Young Photo. (5. we do not know the cause of the crack).—T. C. (your bath is perhaps more in fault than the collodion).—A Lover of Photography (daylight is best).—C. E.—B.—Wellwisher.—J. E. F.—W. F. (improved formulæ have been given).—W. R. C.—R. W. H. (1. we think not).—T. C.—R. B.—J. D.—C. G. E.—S. B.—An Amateur (we do not think it can be done).

Communications declined with thanks:—N.—H. O.—O. P. Q.—Subscriber.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 6.—*October* 15, 1858.

ON COPYING PAINTINGS BY MEANS OF PHOTOGRAPHY.

To obtain a true light and shade representation of a painting, must, at present, be considered as one of the unsolved problems in photography. Whether it will ever be satisfactorily solved is, in our minds, a matter of considerable doubt; at all events, we are not at present in possession of sufficient knowledge to see a probable road to such an end. As this is a matter of very great importance, and we think also of some little interest to our readers, we will enter rather fully into the subject.

If our readers refer to our third number, p. 31, a diagram of the phenomena of the solar spectrum will be seen. It is a representation of a ray of light, with the various colours and forces which are therein contained, laid side by side; and thus their properties, not being neutralised or masked, may be examined and studied. The space occupied between (*d*) and (*c*) contains all these various rays, which are constantly being emitted from the sun, and reflected, in more or less quantities, from every object in nature. A reference to the curved line marked *light* in the diagram, will show the fraction of the entire rays which the human eye is capable of appreciating, under the name of *light;* and it is with reference alone to this portion of solar radiation that paintings and other works of art are executed—with the sole object of satisfying the human eye. On referring to the curved line marked *actinism*, it will be seen how widely different would be the sensation caused by any painting, if looked at with a chemical or actinic, rather than an optical eye. The red, orange, and yellow would show no colour whatever, but merely a black mass; the green would be just visible, whilst the dark blue, in the picture, would be exalted in intensity until it equalled the whitest parts. And when, in addition to this, other rays, hitherto unperceived, were seen shining from different parts of the picture in total disregard of the required visible effect—altering tints, and sometimes, as in the case of yellow and blue, entirely reversing the effect intended to be produced by the painter—it will be seen at once, if the pure colours of the solar spectrum can be taken as a fair type of the colours used by painters, how utterly impossible it will be to obtain a correct light and shade rendering of a painting by means of photography as at present known. But fortunately the case is not quite so hopeless as this. There is a great difference between the colours of the sun and those met with in a paint box; the latter, as may be seen by comparing one with a good solar spectrum, consist, in general, of the *desired* colour, largely diluted with other colours in different proportions; and it is on this dilution that the possibility of ever solving the problem depends. If a painting be copied photographically, and the copy compared with the original, it will be seen at once, that every colour on the canvas has produced *some* effect; even the reds and yellows which, according to the diagram, should be absolutely inert, have emitted, along with the dominant colour, sufficient of the actinic rays to produce a very evident effect on the sensitive plate; and it is by fostering this *false* effect, and diminishing in other cases the *true* effect, that we may hope to ultimately attain the desired result.

The first thing necessary to be done is, to employ that sensitive surface which is impressed with the greatest number of luminous rays. Here, on the very threshold, we meet with a formidable difficulty. Iodide of silver, as used in the ordinary photographic processes, is not sensitive to any of the coloured rays of the spectrum which lie between the line marked *indigo*, and the end (*b*) of the diagram; whilst bromide of silver, about which so much has been said in respect to its power of reproducing colours, is equally insensible to all colours below a point opposite the word *green* in the diagram. However, something will be gained by employing the bromide of silver as the sensitive medium instead of iodide, as we thus obtain a mastery over the blue, and part of the green rays; and, as green occurs in almost all the colours used by artists, we by this means gain a great point. Another important step is, to destroy the action of the powerful *actinic* rays (including, in this term, the violet and lavender, as well as the invisible rays). This is not difficult; a thin layer of solution of sulphate of quinine, between parallel glass plates, interposed between the lens and object, will effectually cut off all above the indigo; a thin piece of yellow glass employed in the same way will act even more vigorously, and, were it not for the uneven surface which this kind of glass usually has, it would answer the purpose admirably.

By employing the information above given, it will be possible to obtain far more correct copies of paintings than are usually to be met with. The collodion should not be iodised, but *bromised*, with four grains of bromide of cadmium to an ounce of plain collodion; and the lens, which must have a sheet of yellow glass close in front of it, should be a portrait combination, working with the full aperture, as the time of exposure to the feeble rays, which alone can filter through the yellow glass, will be enormously prolonged, even when the picture is illuminated as perfectly as possible. The plate should be slightly *over*-exposed, so as to diminish still further the unavoidable exaggeration of the lighter parts of the painting, and, at the same time, bring out the detail in the dark parts. We are of opinion, that better results may be obtained by increasing the number of thicknesses of yellow glass in front of the lens. An experiment of our own will show, how far this modifies the usual photographic action:—A strip of card was painted with several brilliant colours, and then a photograph was taken of it, with iodised collodion, in the ordinary way. It came out, as might be expected, with the photographic order of intensity totally unlike the *visible* gradation of intensity. Bromised collodion was now used, and the result was much better; one thickness of yellow glass was then interposed, and the effect, whilst it

increased the time of exposure from seconds to minutes, gave a very marked improvement in the truthfulness of the picture. A second piece of yellow glass was afterwards used, which had the effect of still further increasing the resemblance to the light-and-shade effect of the original colours; and thus we went on, at each addition of yellow glass obtaining a slightly truer translation of the colours into light and shade, but at an enormous sacrifice of time, until, at last, the plate would not bear the necessary exposure; and, at five thicknesses, we were obliged to desist. At this stage, the photographic effect of the different colours was much nearer their true effect on the retina than if they had been copied in the ordinary way; but they were still very far from giving the tones which an engraving of the same subject would have presented. The too energetic action of the blue colour was entirely overcome, but the red and yellow still offered difficulties which, we fear, no amount of obstruction would ever have properly overcome. The subject, however, is one which, from its importance, deserves more, far more attention, than has yet been paid to it; and we have dwelt thus long upon it, in the hopes that we may induce some experiment-loving amateur to take the subject up *con amore*, and assist further in elucidating this most difficult application of the science of photography.

PHOTOGRAPHY AT CHERBOURG.

Among the multitude of visitors, foreigners, tourists, artists, and writers who crowded to Cherbourg during the fêtes, there were, as might have been expected, a goodly number of photographers. Wherever anything was to be seen, there we were sure to find a camera planted, and sometimes several. Such opportunities as were offered on this occasion are rare. It was not to be supposed that photography could be behind-hand in recording the magnificent spectacle offered by the combined fleets at anchor beneath the admiring gaze of an enthusiastic multitude assembled from all parts of Europe, in perpetuating the remembrance of the great events of the epoch. The French administration, foreseeing and appreciating the importance of the services the art was capable of rendering, had officially charged M. Baldus, the photographer of the new Louvre, to take different views of the anchorage and the fleets. The mission was honourable but difficult. In fact, they were sea-pieces, and not simple reproductions, that were required; and, of course, this rendered necessary the employment of processes the rapidity of which would allow figures to be seized while in motion: happily the artist chosen for this task cares little for difficulties, as the proofs he has brought back amply show. Conformably with the instructions which were given to him, M. Baldus chose a point of view from whence the object glass could take in the whole of the anchorage; the ground of all the pictures is the same, the sky above, the sea below, the bold outline of the breakwater forming the horizon, the rocks bathed by the waves forming the foreground. But the subject varies according to the evolutions of the fleets. The size of the pictures is such that the artist has reproduced every detail with a precision which allows the recognition of the humblest boat in this animated and floating crowd. The masts crowd together, the sails are loosened, the bowsprits cross each other, the flags mingle, and yet there is no confusion, all is as precise in the picture as it was in reality.

M. Moulin, to whom a kind recommendation of the Minister of Marine assured access and protection wherever he presented himself, was thus enabled to compose an album into which the illustrated papers have dipped deeply for their most interesting pictures. The twenty-four proofs of which this album consists represent the principal episodes of the fêtes, and are very remarkable for their execution. They are full of light and movement. Those obtained during the filling of the basin named, after the Emperor Napoleon III., and the launch of the *Ville de Nantes*, are especially of a most striking appearance on account of the animation of the spectacle they represent. The clearness of the design is such that one can distinguish dresses and uniforms in the crowd, and the attitudes of the greater part of those present. It is extremely curious to pass in review, with the aid of a magnifying glass, the microscopic groups which seem to move under the gaze. The views taken of the anchorage are not less striking. If it is difficult to seize a crowd in motion, it is not less so to reproduce a squadron in the act of saluting its august visitors with broadsides. This difficulty M. Moulin has overcome with a success which does honour to his ability.

Another artist, M. Furne, junior, already known by previous works, has taken a numerous series of stereoscopic views of Cherbourg, the subjects of many of them trivial enough, but still not without interest. M. Richebourg also took many similar views; among others, a view of the arrival of the imperial party at the railway station; the Bishop of Coutances pronouncing the discourse at the reception of the Emperor, &c. A singular circumstance occurs in these pictures—each of them records the moment when the scene represented took place, inasmuch as it reproduces the station clock, by which we are enabled to see that the Emperor arrived precisely at five o'clock, the prelate pronounced the receptional discourse at five minutes after five, and at a quarter past five the engines were blessed. We think it is scarcely necessary to point out the importance of such precision in certain cases.

QUESTIONABLE SUBJECTS FOR PHOTOGRAPHY.

"Alas, poor Yorick!"
"To what base uses we may return!"

We were recently attracted by an advertisement to the following effect:—"Extraordinary stereoscopic novelty! 'The Skeletons' Carouse!!'"

The feeling we experienced on the perusal of the above was something like that which a man feels on reading the play-bill of one of our transpontine theatres, which seem, as a general rule, to flourish on a class of play that has more or less of the mysterious or horrible in its composition. We are all acquainted with those large poster announcements which inform the reader that a certain play is received with nightly applause; and the advertisement of "The Skeletons' Carouse" can excite but one feeling—that of curiosity, to see how the subject would be treated, and whether the fact would bear out the strong adjective which informed us that it was "extraordinary." As we are particularly desirous of seeing and knowing all that transpires in the photographic world, whether it be useful or ridiculous, we followed the directions of the advertisement, and forwarded twenty-four postage stamps to the depôt, for which we received a slide which is, in reality, an "extraordinary novelty!" It is a picture of six *human* skeletons, in all their ghastly reality, seated round a table, on which are placed all the necessary accessories of pothouse paraphanalia. At the head of the table sits one of the figures, with a presidential air, while the rest are posed as if in the act of conversing. On the

floor is a spittoon and a lantern; the former, no doubt, being requisite, as the whole of this ghostly crew are supplied with cigars and pipes! We certainly must give credit to the arranger of this group, who has placed the figures in very natural attitudes. The *tout ensemble* appears very much like a madcap freak on the part of some medical students, who, we are led to suppose, are anything but reverent to what ought to be considered most sacred—the human body after death. We cannot find words strong enough to express our disapprobation of the publication of this slide. There is something about the whole affair so flippantly sacrilegious, that it cannot fail to disgust any right-thinking person. It is well-known that, even when science demands that a body should be subject to medical examination, there is always a strong feeling against such a proposal; and it is often only by urgent representations that the relatives of deceased persons can be induced to allow the bodies of their dead friends to be thus mutilated. But what must we say of this gross violation of all the laws of decency and propriety? Were not all these six skeletons at one time living men, who moved and breathed, and took part in the duties of life as we do now? and though they may, many a time, have repeated the words of Shakespeare,

> "Imperious Cæsar, dead and turned to clay,
> Might stop a hole to keep the wind away.
> Oh that that earth, which kept the world in awe,
> Should patch a wall, to expel the winter's flaw!"

yet it is certain that it could never have occurred to them that at some future day their skeletons should be made the subject of a jest in a stereoscopic slide! What meaning there is in the idea of this picture we are unable to understand: we are not aware that, even in the extravagant class of plays to which we have alluded, there is any drama which furnished the groundwork of this picture; and, certainly, there is no sense in the idea. It is, to our minds, the result of a wanton profanity, which would turn into ridicule what ought to be held in religious veneration. We think that a sense of propriety will at once forbid any more traffic in this disgraceful attempt to travestie the most important aids of anatomical science; and we are at a loss to conceive how people can have so far forgotten their own self-respect as to encourage the sale of such a disgusting picture, unless they buy it—in the blind ignorance we did—simply to satisfy curiosity. There is not a single argument that can be put forth in palliation of this shameless irreverence. The fair way in which to put the matter is,—to ask ourselves if we should feel comfortable at the idea of being thus made the jest of the silly and weak-minded. If there was a scarcity of subjects, there might be an excuse, which cannot now be adduced; and if the argument is that novelty is wanted, all we can say is, that however great the demand for new pictures, that never can be argued as a plea for the extravagant and unwarrantable liberty taken by the composer of this revolting subject. If such a subject is not everywhere repudiated as an insult to popular taste, we blush for the art taste of our countrymen.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

PART II.

MR. R. J. FOWLER next read a paper on "a process for the estimation of actinism." He said:—

"That in drawing the attention of the section to the estimation of the actinic force of the solar radiations, his object was, rather to add what he presumed were new facts to the science of actinometry, than to present a perfect and complete process in every respect. In the sixth volume of "Gmelin's Handbook of Chemistry," he found it stated, that oxalate of ammonia mixed with aqueous proto-chloride of mercury is decomposed under the influence of light—yielding sal-ammoniac, calomel, and carbonic acid. It also stated, that the mixture of the two solutions remains clear in the dark; in daylight it becomes turbid in six minutes, and, in course of an hour, deposits calomel, which, in sunshine, quickly falls down in soft flakes, surrounded with bubbles of carbonic acid. The filtrate no longer contains mercury, but chloride of ammonium and undecomposed oxalate of ammonia. On seeing this, he was at once struck with the idea, that here might be the elements of a process for actinometry; and whether this was the fact, he left them to judge from the experiments he had tried on the subject. He found it true that the solutions named might be kept unchanged for an indefinite period in the dark; that the calomel began to precipitate in from fifteen to twenty seconds in full sunshine; and also, that the precipitation ceased immediately the vessel containing the solution was removed from solar influence; thus showing, that the action is not continued in darkness, even when the change has been partially effected, and that the action of the actinism is not, in this case, catalytic. He had also exposed three tubes, containing the mixed solutions, to pretty uniform light; No. 1, for ten minutes; No. 2, twenty minutes; No. 3, forty minutes—the result being, that No. 2 contained twice the bulk of precipitate of No. 1, and No. 3 twice the bulk of No. 2. When the solutions were exposed several hours, the vessel containing them was found to be completely filled with a magma of the precipitated calomel. From the experiments, it appears conclusive, that the mixture of solutions of oxalate of ammonia and proto-chloride of mercury, is very sensitive to light; and, as this action of light is not catalytic, the precipitate obtained may be considered as produced by solar influence alone; and, lastly, that a definite amount of precipitate is produced by a definite amount of actinic force; thus proving, that there are elements of certainty and uniformity in the behaviour of mixed solutions when exposed to solar influence, from which a certain method for estimating the actinic force may be formed. If extreme delicacy were required in the estimation, the precipitate might be collected, dried, and weighed; but where this was unnecessary, graduated tubes might be used for exposing the mixed solutions, and from which, after standing a certain time in the dark, the amount could at once be read off. Mr. Fowler stated that, in his experiments, he had used a nearly saturated solution of the two salts; but this was by no means necessary, as he found that, if a drop of the solution of proto-chloride of mercury, containing only 1-1500th part of a grain of that salt, were added to 300 grains of the solution of oxalate of ammonia, and exposed to the light, the calomel would still be precipitated. The reaction, in fact, being so delicate, that it might be used for a confirmatory test for the presence of proto-chloride of mercury. He states, in conclusion, that it would be interesting to know, how the absorbed actinism of M. Niépce de St. Victor would affect the solutions. He had made some experiments in that direction, but not with sufficient success to warrant any positive assertion."

At the close of Mr. Fowler's paper, Mr. Mercer, F.R.S., exhibited several specimens of chromatic photographs; some being on calico, or a similar fabric, produced by previously soaking the material employed in a solution of pre-oxalate of iron, the effects produced were both singular and novel, and the method promises to lead to photographic colour printing.

Mr. W. S. Warr said, the thanks of the section were due to Mr. Mercer for his experiments; and, in reference to Mr. Ward's paper, remarked, that he could not agree altogether with its author as to the artistic difficulties. To secure the full effect of foliage and water, much exposure was absolutely necessary. The great practical difficulty was to hit the right point between under and over exposure, as the effect of light was more powerful at first than afterwards.

Mr. Smith said, that he believed the simpler the manipulation and material the better. He thought the dry processes a complete failure.

PHOTOGRAPHY IN ALGERIA.

NO. II.

MY DEAR SIR,—For some days after the despatch of my last letter, I employed myself in taking photographs of buildings and other objects to be found in the streets of Algiers. I at first thought that I might be interrupted in my operations by the curiosity of the natives, but I soon found that my proceedings excited very little attention. Whether this indifference on the part of the Arabs is affected or real I cannot say, but certainly one would fancy them to be as familiar with the sight of the camera as they are with the appearance of the parasitic insect addressed by Burns on the occasion of its crawling over a lady's bonnet at church. They pass along without paying the least apparent attention

to my operations; and if I happen to direct the lens towards a body of them, they are not in the slightest degree discomposed, and I have thus been able to obtain pictures free from the stiffness generally apparent in the photographs of groups of individuals where the figures appear to have been arranged for the purpose. These Arabs are perfect as models. I have seen six or seven of them seat themselves on the floor of a coffee-room, and, after lighting their pipes, remain silent and motionless for half an hour at a time. This silence, I imagine, arises quite as much from a want of ideas as from any other cause; in fact, having nothing to say, they don't say it; but start an Arab on the subject of his shooting, or his horse, and he will deliver himself of an oration, containing as many superlatives as an article in a Neapolitan newspaper on his majesty King Bomba, with an energy and gesticulation that would induce a bystander to imagine him to be labouring under an access of fury, and with an amount of figurative boasting that leaves a Yankee far behind. I have myself heard an Arab make a boast, with respect to his horse, which was quite as extravagant as that of the American, who said he had raced his horse against a flash of lightning, and beaten it by three seconds. I believe it to be this want of subjects of conversation which makes the Arabs so fond of listening to the professional storyteller, which they do with a profound attention which many of the tales are far from deserving, if I may judge from the translations that have been made to me; some of them, however, are of a more interesting character. I had sent my camera, &c., to a café in the western suburb of the town, the entrance to which was from a narrow street, being formed by a row of pillars, which allowed a full view of the garden and the summer-house supported on piles over the little river that ran through it. On the ground, in groups of four or more individuals, were seated numerous Arabs, among whom were many spahis, whose uniforms gave a variety to the picturesque scene, which made me wish that photography could reproduce colours as faithfully as objects. I may here mention, *en passant*, that I have been using the uranium printing process, about which so much was said at Paris at the time Nièpce de St. Victor first suggested its use, though, as you know, it was used before then in your laboratory. When I was in Paris, just previous to coming here, I heard such glowing accounts of what had been done by its means, that, as their manipulations were in some points different from yours, I made a note of them, and I have since being here made some experiments, which have induced me to modify the process as described by them, and with exceedingly good results. After preparing the paper with gelatine and nitrate of uranium in the usual way, and exposing it to the light, I develop by means of the aceto-nitrate of silver bath, such as is used for paper negatives; and on removing it from this bath I plunge it into a bath composed of 100 parts of water, 9 of proto-sulphate of iron, and 3 of acetic acid. I have obtained proofs in this way equal for depth and vigour to any I ever saw. I need not tell you that there is no truth in the assertion that pictures printed with uranium are unassailable (which I was repeatedly assured in Paris was the case); but still I think, until we hit upon some carbon process, we shall find no substance which will give such durable pictures as nitrate of uranium.

After I had taken three or four negatives, I sent my man with the apparatus to the hotel where I was staying, and then went into the summer-house and called for coffee. There were about twenty Arabs seated there in a circle, listening to one of these storytellers; and, as several of them had taken their pipes from their mouths and had ceased smoking, I concluded that the narrative was of unusual interest, and I was soon convinced of this by the excitement they displayed as the story drew near its *dénouement*. After the *raconteur* had finished, and "sent round the hat," I beckoned to him, and desired him to sit down, and relate the story in French for my benefit. It was, in substance, as follows, and, as he assured me, strictly true, and of recent occurrence:—A young Arab, named Ishmael, became acquainted with a girl belonging to a tribe at enmity with his own, and a strong attachment sprang up between them. Eventually the girl agreed to leave her father's house, and to fly with her lover to the douar he inhabited at no great distance, but which was situated on the opposite side of the mountain. She left her home a little before sunset, and joined Ishmael, who, too poor to possess a horse, was to conduct her over the mountain on foot. The path was through a wood, and they were well aware that a lion was accustomed to reside there for months at a time; but, as was the case with the "ladye-love" of Sir Richard of Coldinghame, so with them—"love conquered fear;" and they had crossed the mountain, and were actually in sight of the friendly douar, when, right before them, in the middle of the path, lay an enormous lion. They stood petrified with fear, gazing at the beast, who appeared not to notice them at first, but after about a minute he rose and moved towards them. The girl uttered the most piercing shrieks, which were heard at the douar, the inhabitants of which armed themselves, and proceeded in the direction of the group formed by the lion, Ishmael, and his bride. At the moment they came within gunshot, the lion was leading the man, who appeared to be under the influence of a species of fascination, into a thicker part of the wood. His arm was round the waist of his betrothed, who seemed to struggle to free herself from his hold, but in vain, and the Arabs saw at once, that if they were to save the unfortunate couple no time was to be lost. Accordingly they all fired at the lion at once, and the beast was probably wounded, for he sprang upon Ishmael, placed a paw upon each shoulder, took his head in his mouth, and crushed it, and then, without tearing the body, dropped it to the ground. The girl had sunk to the earth in an almost insensible state; and when the Arabs, who had fled immediately they had discharged their guns, again came near the spot, they saw her sitting on the ground, and the lion lying down with his head resting on her knees. To fire at the animal in the position in which he was, was almost certain death to the girl; but a moment's reflection convinced them that it offered the only chance of saving her. They accordingly fired; and, before the smoke had cleared away, the lion was in the midst of them. He struck one dead with a blow of his paw, crushed the head of another in his mouth, and pursued and caught a third, whom

he lacerated in a frightful manner, and then returned to the girl. Of course, after this, no further attempt was made to rescue her; and how long she may have remained in this valley of the shadow of death before the beast released her from her agony, cannot even be guessed at; but when daylight dawned and the Arabs came to seek the bodies of their friends to bury them, all that remained of her was no more than was left of Jezebel whom the dogs devoured in Jezreel.

The professional storyteller, among the Arabs, is a man of no inconsiderable talent. He is a good actor, suits his gesticulation to his subject, has great command of voice, and, in narratives like the above, absorbs the entire attention of his audience; consequently, like the minstrels of old in our country, he is well received wherever he may go, that is, among the Arabs, who are not repelled by the extraneous vitality which circulates about him. With Frenchmen the case is different; for though they are not over-fastidious with respect to their ablutions, they are not to be compared to the Arabs, who regard soap as superfluous as hair-curling fluid to a nigger, or crinoline to a Hottentot Venus.

I have not been here long enough yet to say authoritatively that there is little love between the French and the natives; but, as far as I have been able to judge, the Arabs regard their conquerors with great dislike and some fear, and with profound contempt as individuals. The latter feeling arises in part from the arrogance inspired by their religion, which induces them to look upon professing Christians as little better than dogs, but principally from the vivacious character of the Frenchmen, whom they see dancing and otherwise conducting themselves in a manner which they regard as unmanly. Of course, you have heard and read, what has been so often asserted that it appears to be generally admitted as a fact, that Frenchmen have a peculiar talent for insinuating themselves into the affections of uncivilised people, which Englishmen do not possess. I don't believe a word of it. It may be true in the case of French sailors, when they are

"All among the Hottentots,
Capering on shore,"

but does not apply when Frenchmen are permanently resident among a less barbarous people, especially if that people is composed of Mohammedans, who, though they may despise the Englishman's religion, yet cannot but feel a certain degree of respect for the calm and serious man himself.

In my last letter, I mentioned that I had been partially successful in obtaining certain photographs of the execution of the murderers of poor Gilson and his family. I am sorry to tell you that my success is not so great as I imagined. The third and fourth pictures have faded quite away, and the second so much as to be entirely useless; the first alone retains its distinctness. I am quite unable to explain the cause. I am convinced, however, that it arose from no fault in the manipulation, and of the goodness of the collodion I have since had ample proof; consequently I can only attribute it to the atmosphere around the scaffold being affected in some such way as that suggested in my last letter. A similar occurrence once happened to me in the course of a tour in the south of France. I had selected a view, and fixed my camera in the expectation that I was about to obtain a photograph of a pretty little cottage in the midst of a vineyard; but, on withdrawing the slide, I found nothing but a bleared and indistinct appearance of the object. I at first imagined that the pose had been too short, and made a second attempt, which was likewise a failure. I persevered; but, notwithstanding the adage to the contrary, my perseverance was *not* rewarded. I next looked about for the cause of such an effect, and eventually I found, that a building at no great distance was an animal charcoal factory, and I could only impute my failure to the supposition that the atmosphere was, to a certain extent, charged with the vapours arising from this factory. To test this, I determined to visit the spot at daybreak the following morning, and make a renewed attempt. There had been a pretty brisk breeze all night, which died away directly after I had planted my camera to the windward side of the factory, and I obtained excellent views; yet, when I tried again in the course of the afternoon, I failed as before, thus proving, beyond all reasonable doubt, that my supposition was correct.

I have become acquainted with a sheikh who owns an extensive douar near Constantine, and I have partly promised to go with him when he leaves here, and spend a few days in his tents, which will give me an opportunity of getting some interesting pictures for the stereoscope. He is a bit of a bore sometimes, especially when he gets on the subject of his horse, of which, though it is not much to look at, he tells me wonders, more particularly with respect to its pedigree, which, according to his showing, must date back almost as far as that of the Welshman, who exhibited, about half way down the parchment on which his genealogy was written, a note in the margin:—"*About this time the world was created.*" Excepting this, and a weakness in favour of Frenchwomen, rather unworthy of an Arab and a sheikh, he seems a very estimable man. I have not received any copy of your "NEWS" yet, and as I propose leaving here next week, I am afraid I shall not see it until I return.—Yours truly,

C. A.

P.S.—In the event of your publishing the above letter, pray omit professional details as much as possible. I prefer rather to amuse than to bore your readers with contrivances, which, if they appear to me ingenious, would no doubt suggest themselves to any photographer similarly circumstanced.

Critical Notices.

REVIEWS OF BOOKS.

The Ambrotype Manual. A Practical Treatise on the Art of Producing Collodion Positives. Principally selected from the works of C. A. SEELY, A.M., Editor of the "American Journal of Photography." First English Edition. Liverpool: J. Atkinson.

THIS pamphlet, as its title informs us, is a reprint of an American work, written by the editor of one of the American photographic journals. The go-ahead style of writing which more or less characterises all Transatlantic effusions is carried out here to the usual extent. We have seen a few numbers of the journal which Mr. Seely conducts, and have certainly been amused at the free-and-easy style in which matters are treated. There is that smartness—to use an

expressive term—which characterises the style of a few of our London writers for the Press—a style in which there is sometimes an evident striving after effect—even at the expense of perspicuity. In periodical literature there is an excuse for this, and in the present day it is more or less expected. But when a writer presents his ideas to the reading world in a pamphlet form, it is generally expected that his thoughts have been matured, and that its style should not be too strongly marked by that flippancy which is pardonable in serial writing. To illustrate the manner in which the writer treats his subject, we cannot do better than extract the laconic paragraph which is entitled the Preface, in which he says: "The writer of this little book has done his work without ambition or concern. The art of Ambrotyping seems to him a simple thing, and he aimed only to tell the story plainly. Moreover, there is enough demand to sell the work and satisfy the publisher—the main point."

There seems a slight discrepancy between the first sentence, in which there is a disavowal of "ambition or concern," and the last, which says that the "main point" in publishing the work "is to satisfy the publisher," who, by-the-bye, in America, is Mr. Seely himself!

We are always glad to see any addition to our photographic literature, especially anything which simplifies the art as this work does—to the American reader. While we are grateful to Mr. Atkinson in giving us a reprint of this work, we cannot help thinking that if he had translated it into English, or even the equivalent slang of this country, it would have added much more to the value of the work; for it must be remembered that, interested and amused as we are at the eccentric phraseology used now and then by American writers, we are by no means well versed in the capacious vocabulary of Yankee slang. We do not write this in any hypercritical spirit; on the contrary, we rather enjoy the manner in which photography is "made easy" by the writer. But we think that the few hints suggested above might be the means of increasing the value and usefulness of the work.

In the chapter headed "Advice to the Beginner," there are the following racy directions for cleaning the plate:—"The work is easy enough, yet judgment and skill are necessary. For the lack of these I have seen much time and manly strength wasted. A booby goes at a plate with fierce rubbing, scouring, and scratching, bearing on as if dirt was to be squeezed out, punishing the innocent glass dreadfully;—beginning with a dirty plate, leaves it in the same condition." There is certainly a great deal of truth in the foregoing, and it is put in a manner which we conceive is adapted to the comprehension of the dullest intellect. His laconic advice in regard to pouring collodion on the plate is very appropriate. Speaking of the particles which invariably produce blemishes, he advises the operator to make it a rule to wipe the mouth of the bottle before pouring, "and always obey it." In regard to photographic chemicals, he gives some excellent advice, which we sincerely recommend to the readers of the "Photographic News." He says that if "any one who has a proper interest in the art will pursue the subject beyond this little work, let them read a *Photographic Journal and study chemistry*." Let our readers do the former, and in our articles on "Photographic Chemistry" we think we can materially assist them in the latter. The writer denounces in rather vigorous terms the various nostrums which have been put forth for making "white varnish," and which he expressively sums up in one word, "Humbug." On the subject of gun cotton he is witty, and thinks that the attempt to make it "furnishes an excellent opportunity to ruin a suit of clothes, weaken a pair of lungs, and to get a mass of stuff that can't possibly make a good picture;" and possibly by a slight mishap, such as breathing the vapour evolved during the preparation, it "will insure you a speedy passage to the spirit-land." The foregoing will give our readers a good idea of the jocular style in which the work is written. Even for the non-photographic reader a vein of humour runs through the whole of the book which would make it readable, although the chemical and photographical allusions were totally unintelligible. The great fault of the work is, that it deviates from the law which governs, or ought to govern, all scientific compositions, viz., that in every language there should, if possible, be an uniformity of terms; because nothing can be more difficult to the reader than to find a number of new terms introduced into the work, the meaning of which he has either to guess or remain in ignorance of. For instance, why entitle the process "Ambrotype," when in this country it is known as the "glass positive" process? What is the meaning of a "camera shield" or a "plate vise"? We have not space to detail the number of terms, which we are sure will puzzle many English readers. To American writers on photography we would give one word of advice, and that is, "Use the same terms in America as are used in the mother country," because we are sure that the claim which a 'cute Yankee once made, that English was *first* spoken and is now *best* spoken on the other side of the Atlantic, will not be conceded. To those enterprising photographers who wish to excel in Ambrotyping, Balsam sealing, Crayon Ambrotyping, Melianotyping, Sphereotyping, Mirror Ambrotyping, Neillographing (!), Pearl Ambrotyping, Imperial Ambrotyping, Relievo Ambrotyping, and Double Figuring (!!) we heartily recommend this work.

Photographic Chemistry.

NATURE OF THE METALS.

We shall now proceed to consider the nature of the metals, upon which we propose making a few general observations. To a common observer it might appear that all metals are substantially the same, and that the different appearances they present might arise from the accidental presence of some colouring matter. This was the opinion actually entertained by the alchemists of former days, who believed that gold was the basis of all metals, and their efforts were consequently directed to eliminating from a mass of lead or other base metal that which prevented it from appearing in its primitive condition. This opinion, it is needless to say, is not shared by the chemists of the present day, who, considering the different degrees of hardness, strength, brittleness, &c., possessed by the metals, believe them to be of different natures. They have, however, certain qualities in common, metallic lustre, density, hardness, opacity, tenacity, ductility, malleability, fusibility, and as conductors of heat and electricity they differ only in degree.

By *metallic lustre* is meant the property possessed by metals, when polished or freshly cut, of reflecting light. *Opacity* is the property which these bodies possess of interrupting the passage of light; except when beaten out into a leaf of extreme thinness, when they become translucid.

By *density* is understood the weight compared with the volume. All metals, with the exception of sodium or potassium, are heavier than water, the heaviest of all being platinum; their respective densities may be classed as under:—

A volume of water weighing	...	...	1·00
The same volume of platinum will weigh		...	22·69
„ of gold	„	...	19·25
„ of mercury	„	...	13·54
„ of lead	„	...	[illegible]
„ of silver	„	...	10·47
„ of copper	„	...	8·87
„ of iron	„	...	7·78
„ of zinc	„	...	6·86
„ of aluminum	„	...	2·56
„ of sodium	„	...	0·97
„ of potassium	„	...	0·86

Metals differ in *hardness*—the two extreme examples being iron and lead. They are *ductile*, that is to say, they may be drawn out into threads; their ductility ranks as follows:—Gold, silver, platinum, iron, copper, zinc, tin, lead. They are also *malleable*, that is, they may be beaten out into

sheets of greater or less thinness, according to the degree in which they possess this quality; they may in this respect be classed as follows:—Gold, silver, copper, tin, platinum, lead, zinc, iron. Platinum and gold are so extremely malleable and ductile that the former may be drawn out into wire so fine as to be almost invisible to the eye, while the latter may be beaten into leaves so thin that 50 square inches will not exceed one grain in weight. As conductors of heat the metals stand in the same order as with respect to ductility, but as conductors of electricity their position is somewhat different. First in order comes copper, then gold, silver, zinc, platinum, iron, tin, lead. The heat at which metals melt varies in degree; thus platinum and some others are infusible in a furnace, tin melts at 250 degrees, and mercury is a liquid at the ordinary temperature of the atmosphere.

All metals combine with oxygen to form metallic oxides; and, owing to their varying affinities for oxygen, they have been divided into six sections or classes. In the first are included potassium, sodium, lithium, barium, strontium, and calcium. The affinity of these metals for oxygen is such that they decompose water at ordinary temperatures. In the second section are included metals which decompose water at a temperature under red-heat; these are aluminium, magnesium, zirconium, yttrium, manganese, and some others of less importance, which are little used in the natural state or in combination with other substances. In the third section are included those metals which decompose water only when they are at a red-heat, or at ordinary temperatures when under the influence of acids; these are iron, nickel, cobalt, zinc, cadmium, chromium, vanadium, and uranium. In the fourth section are classed tungsten, molybdenum, osmium, tantalum, titanium, tin, and antimony; all these metals possess the first property of those of section three, but not the second. The metals of the fifth section—bismuth, lead, and copper—decompose water only at exceedingly high temperatures.

The metals included in the preceding sections can unite directly with oxygen; and some of them even at ordinary temperatures; moreover, their oxides are not decomposable by heat alone. The metals included in the sixth section differ from the others in that they do not decompose water, and their oxides can only be decomposed by the action of heat, under the influence of which the oxygen is given off, and the metal alone remains. They are platinum, gold, silver, rhodium, mercury, iridium, palladium, and ruthenium.

There is another method of classifying metals which is more simple than the above: this consists in dividing them into alkaline metals, the oxides of which form powerful alkalies, like potassium, sodium, &c.; earthy-alkaline metals, like calcium, barium, and strontium, which usually enter into the composition of earths and stones, the oxides of which also possess an energetic alkaline reaction; earthy metals, such as magnesium, the oxides of which have little or no alkaline reaction; and, finally, in *metals properly so called*, which are those most commonly known as such. We have adopted the former method as being clearer and more precise.

(To be continued.)

Dictionary of Photography.

Acetic Acid (*continued*).—*Glacial acetic acid* is prepared, 1st, by distilling an intimate mixture of 1 part oil of vitriol with 2 parts of dry pulverised acetate of potassa, or lime, or with ¾ part of acetate of soda, or 3 parts acetate of lead. Whichever acetate is used, it must be dried by exposure to a gradually increasing heat, and stirred all the while, and the oil of vitriol must be previously freed from excess of water by boiling.

2nd. By distilling acetate of potassa alone. When an excess of moderately strong acetic acid is mixed with acetate of potassa, and heated, part of the acid unites with the acetate of potassa, forming biacetate; if, after having driven off the excess of acetic acid by heat, the dry biacetate of potassa be introduced into a retort, and heated to a temperature below 300°, glacial acetic acid will be evolved, which, by rectification, will be obtained quite pure. The residue in the retort will be acetate of potassa, which will serve for repeated operations.

3rd. By distilling neutral acetate of copper. The distillate must be purified by rectification from water and copper, which is mechanically carried over.

Glacial acetic acid may contain, as impurities, *sulphurous acid, sulphuric acid, hydrochloric acid, nitric acid, acetate of potassa, soda, lime,* or *lead.* These may be removed by digesting it for some time with finely pounded dry acetate of lead, and then redistilling it. It may also contain *acetone* and *empyreumatic oil*, produced by over heat during distillation. These may be removed by freezing, and separating the solid portion, which will be pure acetic acid, from the liquid portion, which will contain the above impurities. Lastly, the glacial acid may contain an excess of water: this can be told by the acid not entirely solidifying at a low temperature; it may be removed by distillation from excess of dry charcoal powder; the water will come over first, and, lastly, the glacial acetic acid.

To detect injurious impurities in acetic acid, dilute the glacial acid with its own bulk of water, and dissolve a crystal of nitrate of silver in it (about two grains to a drachm); if no white precipitate be formed, the absence of *sulphurous* and *hydrochloric acids* may be inferred. Now expose the mixture to sunlight for half an hour; if at the end of that time there is no discoloration or precipitate, acetone or empyreumatic oils are absent. The presence of sulphuric acid will be told by the production of a white precipitate, on adding a drop of a solution of chloride of barium to the diluted acid. The presence of an acetate may be known by the acid leaving a solid non-volatile residue, when evaporated to dryness on a clean surface of glass or china.

Pure glacial acetic acid becomes solid at about 15°, but when solid, does not liquefy until a considerably higher temperature is reached. It has a pungent, sour taste and smell, and acts as an acrid poison. If heated to its boiling point, the vapour is capable of burning with a very dull blue flame. It absorbs moisture from the air; but, when mixed with water, does not evolve much heat. It is capable of precipitating many salts from their aqueous solutions, by abstracting the water. In its most concentrated form it dissolves dry carbonate of lime, potassia, soda, magnesia, &c., either slowly, or not at all; although, when diluted with water, it acts upon them in the most energetic manner, dissolving them, and forming acetates. For photographic purposes *Beaufoy's* acid is frequently used; this is cheaper, and may be met with at most druggists where the glacial acid would be difficult to obtain. It is more liable to be contaminated with impurities than the glacial acid, and should be submitted to the tests given above before using. It contains 30 parts of glacial acid, and 70 parts of water.

Acetic acid, either glacial or otherwise, is employed

largely in all photographic operations. In the negative paper processes acetic acid is added to the solution of nitrate of silver with great advantage. When the paper is first impregnated with iodide of potassium, and, when dry, floated on a solution of nitrate of silver, acetic acid is added to this latter solution. It probably assists in the decomposition of the iodide present, both by reason of its superior strength to hydriodic acid, and also by penetrating the paper more rapidly than a pure aqueous solution would do; a property which acetic acid possesses in a very high degree.

The chief use of acetic acid, however, is as a retarding agent, to moderate the too ready decomposition of the sensitive silver surface. Mixed with nitrate, or gallo-nitrate of silver in the talbotype process, it preserves the purity of the whites of the picture, partly owing, doubtless, to its property of preventing the precipitation of oxide of silver, on which it exercises a powerful solvent action. In the developing solution used in the collodion process, and also in the nitrate of silver bath, its beneficial effect, as a retarding agent, is very evident.

(To be continued.)

A Catechism of Photography.

IV.—GENERAL PRINCIPLES OF PHOTOGRAPHY.

(Continued.)

Q. What is the action of light in those instances in which the photographic picture is latent, or in other words, where is it necessary to employ a subsequent process to render the picture visible?

A. In these cases it is difficult to determine its mode of action, and all that we can offer is hypothetical. The opinion most generally received is, that a chemical action does actually take place although its effects are invisible.

Q. Is this hypothesis corroborated by facts?

A. It is so to a very considerable extent. 1st, by the fact that salts of silver are almost all reduced by the action of light. 2ndly, that in certain preparations the picture is slightly visible on being withdrawn from the camera, the sensitive coating having acquired a slightly brown tint, proving that a chemical action has taken place, and a subiodide or metallic silver formed.

Q. What is adducible from these facts?

A. That although the chemical action is in most cases invisible, it nevertheless actually takes place, and is solely attributable to the effect of light.

Q. Is this the only hypothesis which is held with respect to those photographs which require subsequent development?

A. No: it is thought by some persons that the separation of the combined molecules of iodine and silver is only partially performed by the light, and is completed by the action of the reducing agents used in the developing process. Here, as in the first hypothesis, we have a chemical action of light on the sensitive surface; but in this case the gallic acid or pyrogallic acid ought by itself, in contact with the iodide of silver, to develop the picture, which, so far as our experience extends, it fails to do.

Q. Is there a third hypothesis?

A. The third hypothesis assumes that the coating of silver is of such exquisite sensitiveness, that without any chemical action being produced, the light causes a disturbance of the molecules, and that these molecules, endowed with a certain magnetic action, acquire the property of attracting others to their surface. Whichever hypothesis be admitted, the subsequent action of the reducing bodies is easily explained.

Q. In what way is the action of the reducing agents explained?

A. With regard to the part performed by the reducing agents, we hold that the function of the re-agents which causes the appearance of the photographic picture, is to distribute over the surface molecules which fix themselves upon those parts which have been affected by the action of light, and to form a deposit in virtue of a force which is termed molecular attraction.

Q. Can you furnish any proof of these assertions?

A. If the object of the exciting bath was simply to continue the reduction of the iodide of silver, the reducing liquids (solution of gallic or pyrogallic acid, salts of protoxide of iron, &c.) would act without its being necessary to add nitrate of silver. Now, a sensitive collodion plate, perfectly washed and exposed for a certain length of time to the light, does not give the slightest trace of an impression. No picture appears after an immersion of four hours in gallic acid. Yet the same plate, if a little nitrate of silver be added to the gallic acid, furnishes a perfect picture.

Q. Why is this?

A. Because the nitrate of silver is decomposed by the gallic acid, and the silver is deposited on those parts which the light has affected.

Q. Can you mention any other proof?

A. As a second proof, it may be stated that the picture in numerous cases exists only on the surface of the plate, and may sometimes be effaced without injuring the collodion, the coating of iodide of silver remaining intact. If there had been a reduction of the iodide of silver it would have extended completely through the collodion film.

Q. Is any further proof adducible on this topic?

A. The last proof resulting from chemical analysis is conclusive. If the quantity of silver contained in the sensitive coating before the development of the picture be weighed and compared with the same coating after the development of a picture, it will be found that the second contains six times more silver than the first.

Q. How do you account for this?

A. This augmentation of weight can only arise from the deposit of silver formed by the reducing agents.

(To be continued.)

Correspondence.

TRANSPARENT POSITIVES ON GLASS.

Sir,—In your notes to the above title last week, you appeared to arrive, by true induction from the facts presented by foreign photographs, at the conclusion, that they had been copied from negatives by means of the *camera*, and not by *superposition*.

You may therefore be interested to learn, that after some experience, rather extensive for an amateur (extending to nearly a dozen gross) in the spring and summer of 1857, I abandoned superposition, and took to copying by camera entirely. The camera was mounted up against a north window, looking through the pane, and the negative at the polar region of the sky; the illumination of which, being much more constant throughout the day than any other part of the heavens, enabled that most difficult point in photography, viz. length of exposure for successive copies from the same negative, to be arrived at with some degree of precision.

To produce the best results, the right length of exposure is exceedingly important to hit; for, if overdone, the lights are sure to be dulled when the darks are brought out by development; and if underdone, there is no detail in the bright parts.

A very weak and transparent negative (as a plate originally brought out to be viewed as an opaque positive) would require only from two to three seconds, and with that, assisted by proper development afterward (pyrogallic and silver) would produce something like perfect black in the shadows, while the lights were almost as clear as the glass

itself; but with 5 seconds' exposure, the picture was dingy all over. A very dark and fogged negative, on the other hand, would need 3 or 4 minutes; but still, in that case, the resulting positive would be as fine and as refined as the 2 seconds' copy from the faint and clear negative, and, indeed, would appear very similar.

The above results are obtained when the chemicals are working well; but "fogging" has to be guarded against with extraordinary care. When the transparent positives are intended for the *stereoscope*, a small amount of fogging is, indeed, of no great harm, for it acts like the ground glass of the usual slides; but when they are used for the magic lantern, armed with electric or oxyhydrogen light, the smallest approach to fogging exerts the most prejudicial effect on the optical picture projected on the screen.

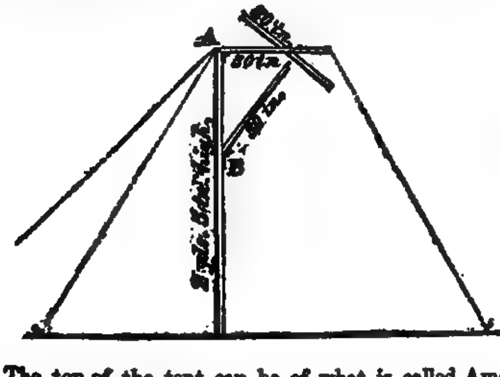
It will be understood that the medium operated on in all these cases was collodion (wet); and the developer, pyrogallic assisted by silver: when there was too little of the latter, the tint was rather inky and blue; but as the silver was increased, the shades became a pure black, producing the most admirable tones in the projected picture.

In short, some of my transparent positives on collodion were (although I say it, who should not say it) as fine specimens of that sort of photography as any that I have seen at home or abroad, showing therefore what the method is capable of; but, up to the last, I have not succeeded in controlling the occasional "fogging" tendencies of the bath and other agents employed. With every new negative, and every different day, some copies were lost before the right exposure could be found: that however I could submit to, and it was something that soon brought its own correction; but the odious "fogging" that would sometimes arise when I thought the chemicals in the best state, this is what tires out one's spirit, and breaks one's heart. I despair of satisfaction there until you, Mr. Editor, have taken up the subject of "fogging" in your "Photographical Dictionary," and have discussed, not only the way to avoid it in a new bath, but the way also of keeping it down in old baths also, notwithstanding the many untoward influences which arise when they are frequently and abundantly used.

October 1*st*, 1858. C. P. S.

PORTABLE TENT FOR TRAVELLING PHOTOGRAPHERS.

Dear Sir,—I herewith send you a small model of the tent I wrote to you about. You must excuse the manner in which it is made. It will show you the plan, one I can well recommend. The framework can be made of some hard wood, such as oak, which would render it less bulky than if made of deal. The tent stands up without being in the ground; only three thin cords fastened by pegs from the points thus,



The top of the tent can be of what is called American cloth, which is light proof; the rest of the tent to be of either yellow calico or tammy, with some other colour, brown or black calico, as an outward cover, having a small square about 12×12 in. cut from off the outer one to facilitate the developing, and the bath could be made fast at a proper height to the upright pole, which is square. Below I give you the dimensions of the woodwork, and cost of the whole.

Hinges to be at A and B. A to fall down when not supported, and the support to fall down when not up, towards the lower end of the pole.

	s.	d.
Woodwork	2	6
American cloth	2	6
25 yds. yellow calico at 4½d. ...	9	4½
Brown calico	3	0
Cost of whole...	17	4½

Beaumaris. J. W. A.

Miscellaneous.

A Substitute for Cyanide of Potassium in Removing Stains from the Skin.—As a substitute for cyanide of potassium in cleansing the hands from silver stains, the following mixture has been suggested by a correspondent:—In a given quantity of distilled water dissolve 10 per cent. of chloride of ammonium, then add 10 per cent. of bichloride of mercury. This mixture may be preserved for any length of time in a stoppered bottle, which should be carefully labelled "poison;" for, though quite harmless when applied to the skin—it does not poison by absorption like the cyanide—it is a very active poison when taken internally. It may also be used to remove the stains of nitrate of silver from wearing apparel of every description; though its success is not so certain in the case of linen that has been sent to the wash since being stained. When the stains on the hands arise from a mixture of gallic or pyrogallic acid with the nitrate, the success of this recipe is less certain; the same, however, may be said of the cyanide of potassium.

Salt an Antidote to Nitrate of Silver.—There are so many photographers who are ignorant of the nature and qualities of the substances they use, that it may not be without interest to them to be made aware that, in the event of an intruder into their laboratory swallowing a piece of nitrate of silver, they have only to send to the kitchen for a remedy. "I was in the act," writes Dr. Ozouf, "of cauterising the pharynx of a child suffering from croup with a rather long pencil of nitrate of silver, when he closed his teeth tightly and bit off and swallowed about one-eighth of an ounce of this substance. The situation was very painful. The little sufferer, already weakened by the croup, and scarcely able to breathe, was rapidly sinking. I at once sent for some common salt, and administered a teaspoonful in a cup of *tisane*, which happened to be standing there. We were obliged to administer it through a funnel; and, at the end of a minute, the child threw up a white curdy precipitate which proved to be chloride of silver, insoluble, and consequently harmless. I repeated the operation five or six times, until the matter vomited contained no trace of poison, of which I assured myself by diluting it with water, so that it was quite limpid, and yielded no precipitate on being treated with salt. It is worthy of note that none of the nitrate was returned as such, the whole having been converted into chloride with marvellous rapidity. . . . . Contrary to my expectation, there was no gastric reaction. I had used about an ounce of salt; there would be no danger in using in a similar case as much as three times that quantity. It should be administered in small doses frequently repeated, so that it may be all used in decomposing the poison, and the administration continued until the matter rejected by the stomach yields no precipitate on being treated with the salt. After this it is only necessary to give emollient drinks, and, if requisite, to sustain strength by tonics."

Mr. Sarony, of Scarborough, has introduced a useful improvement in the production of photographic portraits. It consists in employing two or more negative portraits to produce a positive portrait. The patentee usually proceeds by taking a negative portrait in which every portion of the figure excepting one is sacrificed, in order to obtain an accurate representation of that one portion, say, for example, the head and neck; and afterwards he takes another negative, in which the head and neck are sacrificed, in order that a correct representation may be obtained of the person below the neck, including

the hands and arms, or of those parts together with the lower parts of the figure; and, in taking the second portrait, in order that the hands may appear of the natural size, he removes the camera further back (if the hands be in advance of the other parts of the person), until it is about the same distance from the hands as it previously was from the head. From the two negatives thus obtained he prints the positive picture, printing from the first negative the head and neck, stopping out the hands and other parts of the person by masks, as is well understood; and, from the second negative, the hands, arms, and (if a third negative has not been taken) the lower parts of the figure also. —*Mechanics' Magazine.*

A FOREIGN contemporary contains the following singular narrative, on the authority of a paper published at Dijon:—M. Badet died a short time since after an illness of three months. He was in the habit, during his illness, of sitting at a window looking upon the street, where he remained motionless for hours together watching the passers-by. The house opposite was inhabited by a M. Peltrie, who was not a little surprised quite recently at seeing, to all appearance, the pale, thin face of the defunct M. Badet looking out of the same pane of glass. Great was his emotion, not to use a stronger word. He called in some of his neighbours to whom the visage of the deceased was familiar, and who likewise saw it distinctly. He then invited some men, whose testimony could not be doubted, to come to his house, and who added their authority to his statement. He then pointed out the apparition to the family of the deceased, who, after satisfying themselves of its existence, had the pane of glass removed immediately. "It is, therefore, beyond a doubt, that the glass had taken the impression of the face of the sick man as if it had been daguerreotyped—a phenomenon that might be explained, if on the side of the room opposite the window there had been another window, by which the solar rays could have fallen upon M. Badet; but this was not the case, the room having only one window.'

Photographic Notes and Queries.

EMPLOYMENT OF A CAMERA AS A MAGIC LANTERN.

SIR,—Can you tell me whether all, or any of the lenses of a 3¼ portrait combination could not also be used as the lens for a magic lantern, just to enable me to show tolerably a photograph, as an illustration of a subject at some private lectures?

2dly. What would be the best way to print or take a photograph for use in a lantern?

3dly. A question which I think may be useful to many beginners:—Is there any way of removing stains from clothes some time after they have been made? J. S. K.

[The lens of a portrait combination is the very best that can be used in a magic lantern; and a little ingenuity will soon enable any one to make a very satisfactory instrument for throwing a magnified transparent photograph on a screen.

A transparent picture on glass must be first obtained (see vol. i. p. 22); this should not be larger than the ordinary sized picture which the lens will well cover; then place it in the position occupied by the sensitive plate, or ground glass, and fasten it there, so that light can pass *through* it, but not get into the camera at the sides. Now place a bright lamp behind the picture, and a white screen in front of the camera, in the position usually occupied by the sitter, and the magnified image will be seen. Condensers and reflectors may be used for concentrating the light on the picture; or, if these are not at hand, a moderator or paraffine lamp *with the globe on* may be placed close to it; but, in any case, all light but that which passes through the picture and camera must be carefully excluded from the room. The focussing may be effected in the usual manner, and if the white screen be in the position originally occupied by the *sitter*, and the small transparent positive be the exact size of the negative from which it was copied, the magnified picture will appear life size; and if painted with transparent colours, will produce the most startling effects. We have heard of very serious results arising from an amateur having thoughtlessly exhibited at a private party in this way a coloured portrait of a deceased friend. The second and third queries are answered at pages 22 and 20.]

THE WAXED PAPER PROCESS.

SIR,—Will you kindly inform me, in an early number of the "PHOTOGRAPHIC NEWS," if there is any modification of the waxed paper process, by which an interval of a week or ten days may be allowed to intervene between the exposure in the camera and the development? If not, it would not be a bad idea for some experimental photographers to endeavour to hit upon a plan to achieve that object. Prepared wax paper, with this advantage, would be far better for tourists than any dry process on glass, as the negatives would be almost as sharp—and fifty prepared sheets would not be as heavy as, or more bulky than, half a dozen glass plates of a similar size. Having to develop within twenty-four hours from the time of exposure, and the development requiring large porcelain or glass trays, and taking so much time, are serious inconveniences to tourists, especially to pedestrians, who generally stop at a strange hotel every night, where such a tedious development cannot be well carried on. AN IRISH AMATEUR.

Dublin.

[According to our experience in the above beautiful process —and we have worked at it perhaps as much as any one—the only precaution necessary to be taken, when much time is to elapse between the exposure and development, is plentiful washing. We never tried many experiments with the express view of ascertaining how long the sensitive paper might be kept; but if washed in two changes of distilled water, and then carefully dried, and shielded from the light in blotting paper, ten days or a fortnight may safely be allowed to elapse between rendering sensitive and developing. The exposure may take place at any time in that fortnight, and the exposed sheets can be kept in safety for the remainder of the time.]

ELECTRO-PLATING OLD DAGUERREOTYPE PLATES.

SIR,—I should think it a great favour if you would let me know, through your "PHOTOGRAPHIC NEWS," the receipt to make solution of silver for electro-plating with the galvanic battery plates for daguerreotype. — Yours respectfully, D. E.

[Dissolve chloride or cyanide of silver in a solution of cyanide of potassium, in the proportion of 8 parts of the latter to 1 of either of the former.

The strength of the solution is not of much consequence. A convenient strength will be for the solution to contain one fiftieth of its weight of silver. It has recently been found that when cyanide of potassium is used as the solvent, it gradually decomposes, with formation of carbonate of potassa, which interferes somewhat with the regularity of the precipitation. To obviate this, cyanide of calcium has been recommended as the solvent; the carbonate of lime resulting from its decomposition falls to the bottom, and does not interfere with the process. Plates when silvered in this solution have a dead appearance, and will require to be burnished. It is a curious fact, that if a very small portion of bisulphide of carbon be added to the bath, the silver will be deposited perfectly bright, and with the metallic lustre. A few drops of the bisulphide may be added to a pint of plating solution,

and after well agitating, and allowing to stand for 24 hours, the bath will be ready for use.

The battery to be used for this purpose may be a single cell of Smee's construction, the size and strength must of course vary with the area of the surface to be silvered.]

ARTIFICIAL LIGHT FOR PHOTOGRAPHIC PURPOSES.

SIR,—I see in No. 5, that a correspondent, signing himself "Subscriber," wishes for information on the subject of artificial light for photographic purposes.

I send you the following means of producing an intense light at a cheap rate:—Provide zinc tubes, ⅜ or ½ of an inch in diameter; ram full of bengal- or signal-light composition, a recipe for which was given in a recent number of the "PHOTOGRAPHIC NEWS." On being fired, the combustion of the zinc, along with the composition, throws out an intense light, of great actinic power; the fumes arising from it must be avoided, as they are extremely deleterious.

This is rather similar to the Photogen, but is, I think, an improvement, as the composition does not burn with such great rapidity when confined in the tubes as it does in a loose state.

Your correspondent does not state for what purpose he requires artificial light, whether for copying or portraiture? For the latter, I do not think it would be so advantageous, in consequence of the glare incidental to all such lights. For printing collodion transparencies, I have no doubt it would do extremely well. I have not used it for this purpose, but merely throw it out as a hint for the benefit of your numerous readers.

I must give you my meed of praise. Your journal unites all the good qualities of a scientific magazine, and will prove invaluable to all photographers.—I am, yours truly,

Glasgow. T. B.

ON COPYING PAINTINGS BY MEANS OF PHOTOGRAPHY.

DEAR SIR,—I have perused many photographic works, and made many inquiries of practical photographers upon a point which, I believe, if you could elucidate, you would indeed oblige many of your readers—your humble servant among the number. Do you think it possible to copy an oil picture, so as to give the necessary representation of distance, with all that beautiful gradation of tints used to obtain it in landscape painting? Suppose, as an illustration, I wish to copy a heath-scene, represented in the picture as under a blue sky with fleecy clouds: now, the foreground is a rich, brown heath, and the distance terminates with a range of blue hills, almost melting into air, giving a beautiful and natural effect. Now, would the blue of the distance and sky—being so much more energetic in its influence upon the sensitive plate than the white clouds—alter the position of the tints, and the more retiring become the most prominent; and would not the whole of the yellow gradations in the foreground, if not wholly lost, become far too faint? So that it seems to me to be almost an impossibility to obtain an exact counterpart of an oil painting. For instance, do you think it would be possible to photograph truly one of Turner's gorgeous sunsets? An article treating upon this, or an invitation to some of your artistic correspondents for a contribution on this subject, would, I am sure, be very welcome to most of your subscribers.—I remain, your obedient servant and subscriber, AN INQUIRER.

[An answer to this query will be found in our first column.]

FRENCH BACKGROUNDS.

DEAR SIR,—In a recent impression of the "NEWS," I find one of your correspondents wishes to know the plan of making a French background. The plan adopted by most professionals is as follows:—Take the negative, never mind what the background is. Having done so, print a copy, and cut the figure carefully out; this may be managed very nicely with a small pair of scissors: then take that part from which the figure is cut; place it in the pressure frame, printed side downward, of course; lay the negative upon it, and, by holding it up to the light, adjust it with the thumbs, so as to cut off all but the figure. Thus printed, it will give a white background. Now lay it on the outside of the pressure frame (there are frames sold expressly for this purpose, but this plan will answer); place the figure cut from the first proof—which is called the dummy—nicely on the last printed one; lay a plate of glass on them to keep them in contact; expose again to the light, and, with a piece of card, you may produce any shade you please. W. C.

Ipswich.

VARNISH FOR NEGATIVES.

DEAR SIR,—Your correspondent, "Veritas," in No. 3 of the "NEWS," wishes to know of a good varnish for negatives. I am not acquainted with the French article mentioned there in your answer to him; but if he will try the following, he will, I think, find it to answer perfectly:—Good shell-lac, 30 grains; rectified spirit of wine, 1 ounce; dissolve and filter.

The plate requires to be warmed before the varnish is applied; it also requires to be held before the fire while drying, which takes a few seconds. Should the varnish, made according to the above formula, be either too thick or too thin, the remedy is simple and evident.

I should have written you before this time on this matter, but your number, owing to some neglect of my bookseller, has just come to hand.—Yours truly,

Bervie, N.B. T. C.

SPOTS ON COLLODION POSITIVES.—REMOVAL OF THE BLACK VARNISH FROM GLASS POSITIVES.

DEAR SIR,—I am extremely obliged for the information you have afforded me at page 35 of your valuable journal; but you will doubtless like to know I had previously corrected the defect, by adding 1 ounce of silver dissolved in 5 ounces of water to the bath, and that, ever since then, the pictures have come out admirably. Prior to the addition mine was a 30-grain bath, slightly iodised, and only about three weeks old.

With reference to removing black varnish from glass positives, I have found that by pouring a little of the common crystal varnish sold in the shops over the black varnish, it causes fluidity immediately, and can be removed with a cloth.—Yours much obliged,

Pentonville. J. C. W.

ARTIFICIAL LIGHT FOR PHOTOGRAPHIC PURPOSES.

DEAR SIR,—1. The following is a good recipe for a powerful white light for night photography:—

Nitrate of potassa	7 parts.
Sulphur	2 ,,
Black sulphuret of antimony	1 ,,
Red oxide of lead	1 ,,

Let all the ingredients be very dry, and the nitrate of potass not too finely pounded.

2. Has any one attempted a photograph of the comet?

I am, dear sir, your well-wisher, CHURK.

FORMULA FOR FRENCH SPIRIT VARNISH.

A correspondent has favoured us with the following recipe in answer to an inquiry made in a previous number:—

SIR,—In the third number of the "NEWS," p. 36, you ask for the recipe of the spirit varnish imported from France. The following, I believe, is nearly, if not quite the same:—

Spirits of wine	1 pint.
Gum sandrach	4 ounces.
Best gum mastic	½ ounce.

Yours truly, NIT. SIL.

ANSWERS TO MINOR QUERIES.

To Copy Engravings, &c., Full Size.—*Forward* asks how to take a full-sized copy of an old picture. The body of the camera must be lengthened until the lens is distant from the focussing glass exactly double its natural focal length. The picture to be copied must then be placed the same distance in front of the lens, and it will be represented on the ground glass of its natural size. The stop, in the case of a landscape lens, should be placed nearer the lens than usual; and, if a partial combination be used, it should be between the lenses. (We hardly understand the other queries.)

Ripple Marks on Collodion.—*P. F. P.* has inclosed a print from a collodion negative which is covered with diagonal ripple marks similar to fine scratches, about one-fiftieth of an inch apart. This appearance might be caused by inattention to several points. In the first place, if the glass plate be not judiciously rocked after the collodion has been poured back into the bottle, similar marks will take place; too much pyroxyline in the collodion, or using the latter down to the dregs, might produce them. The most likely cause is, however, the presence of water in the collodion, introduced in the ether (by using *washed* ether before it is rectified), or by employing too dilute alcohol. The second picture is "fading away" through insufficient washing.

Dark Vehicle for Stopping out Skies of Paper Negatives.—*W. M.* asks whether it is possible to obtain a dark vehicle which can be worked properly on waxed paper negatives, to darken skies, or otherwise improve them. We have not succeeded very well by employing paint for this purpose; we think a preferable plan is, to print a positive on plain salted paper, and then, without fixing, cut out the sky carefully with a sharp pair of scissors, and fasten it on to the back of the faulty negative.

Fothergill's Process.—Many of our correspondents have asked us for information on this subject. We would gladly give the results of our experience; but, as many of our readers have no doubt had much greater practice in it than ourselves, we should consider it a favour if they would come forward with the required information, and assist both our correspondents and ourselves at the same time.

Converting Positives into Negatives.—*Q. E. D.*—In preparing the solution recommended by Maxwell Lyte for converting positives into negatives, the strong hydrochloric acid should be diluted with six times its bulk of water, and then as much bichloride of mercury dissolved in this as it will take up. (Your other queries have been already answered.)

TO CORRESPONDENTS.

*** *We are daily expecting a Photoglyphic Steel Plate, kindly engraved by Mr. Talbot expressly for the* Photographic News. *As soon as we receive it we shall have impressions printed, and issue a copy with each Number of our Paper. This we hope to be able to do with the next week's Number. We hope to be able to give at the same time Mr. Talbot's full description of the process.*

W. C., Ipswich.—We are much obliged for the information, and have inserted it in another part of the "News." In answer to the query on the fogging of the dry plates, we have sometimes met with the fault alluded to, but have never satisfactorily made out the cause; it seems to depend on the state of dryness of the plate before exciting. The process was a very good one at the time of publishing, but we have now given it up for more recent and superior ones. Try Fothergill's.

J. W. C.—We are obliged for the information, and have made use of it in another part of the "News." The piece of camphor may be as large as a pea, and should be placed in the filtered solution; the latter will then keep for six months at least, so a good stock of solution may be prepared at once.

C. L. S.—Your fixing solution was not strong enough; add double the quantity of hyposulphite of soda.

Oval.—Perhaps a touch of black varnish would fill up the holes and scratches on your negatives if in the sky. The hand and experience of a good artist, however, would be required if the faults were in the more important parts of the negative.—We can only explain the phenomenon mentioned by the supposition that the glass had been marked in some way or other with the figure before the picture had been taken. It is sometimes excessively difficult to remove such stains from glass; they seem to have eaten into the substance.

J. U.—Leave out the nitric acid in your formula for the developing solution; or, better still, try the recipe given at p. 12.

Albumen.—1. It depends on how you have recovered it. 2. An article will shortly appear on the subject. 3. If kept in glass or porcelain, no; if in gutta percha, yes. 4. We cannot possibly tell. 5. Very slightly acid.

J. Pouncey.—1. The print shall be sent as soon as it is returned by the person who now has it.

Chirurgus.—A portrait lens should have small stops to fit in front of the first lens, and it will then do for views, although not quite so well as a proper view lens. The difficulty mentioned cannot be well remedied. With respect to the processes named, we prefer that marked No. 2.

W. D. W.—Were the robes white or black? We presume the former, and should then recommend, in order to avoid the fogging, employing a medium-tinted background, and a smaller stop to the lens.

A. R.—We hope to be able to give the required information in an early number.

A. E. B. L.—The only cause we can imagine is, the possible presence of a bromide in large quantities in the collodion. Your formulæ are good.

Amateur.—A negative bath should be used. The gradual accumulation of acetate of soda in the bath would tend to put it out of order.

Regular Subscriber, Chelsea.—Would not our advertising columns be more suitable for your case? We cannot undertake to mention such things in the body of the "News."

A Lancashire Lad.—Try the formulæ given at pp. 33 and 35.

Delta.—1. Yes. 2. We have seen Indian-rubber gloves for the purpose. Remember, "A cat in gloves catches no mice." 3. We have used a still for preparing distilled water, and even for rectifying alcohol, without the thought of excise officers entering our head; but we do not know whether we may not have been liable to some severe penalty.

A Well-wisher.—1. Add a few drops of acetic acid to each of your baths; that will cure them. 2 and 3. Already answered in recent numbers. 4. The order of mixing is immaterial. 5. The object of adding nitrate of potassa to the developing solution containing sulphate of iron, is to produce a nitrate of iron by double decomposition. (Vide our "Chemistry.")

A Novice.—Add a little alcohol to your collodion. If we understood your description rightly, that will remedy the fault.

Dilemma.—Your cyanide of potassium is either too impure or too weak to dissolve the iodide of silver. Try hypo.

M. N.—We fancy the honey was not quite pure. We *sometimes* (but seldom) have met with the effect you mention. Add a few drops of acetic acid to it.

G. H.—1. Add a few drops of acetic acid to your bath. 2. We do not know any good plan.

A. L.—P.—Agnes.—Collodion.—A Subscriber.—Xtra.—Our correspondents will see that it is out of our power to save them the trouble which is indispensable in mastering the principles of any science.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—J. G.—Tint.—Williams.—Young Photographer (Halifax).—W. H.—J. T.—A Reader and Scotsman (try Fothergill's).—H. C., Cheltenham.

Communications declined with thanks:—F. W.—A. L.—Alman.—J. J. J.

In Type.—T. Barrett.—W. D.—E. W. B.—J. S. P.—Ignoramus.—R. W. H.—Perseverance.—Z.—R. D.—An Aquatint Engraver.—H. D.—Nit. Sil.—H. C.—J. C. L.—Young Amateur.—W. B. N. C.—T. Gulliver.—F. H.—A. M.—Earnest.—An F. C. S.—J. B.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 7.—*October* 22, 1858.

DESCRIPTION OF MR. FOX TALBOT'S NEW PROCESS OF PHOTOGLYPHIC ENGRAVING.

WE have been favoured by Mr. Fox Talbot with the following description of his new invention, taken from the specification of the patent which has just been enrolled.

"The process described in this specification, to which I have given the name of 'Photoglyphic Engraving,' is performed in the following manner:—

"In this invention, I employ plates of steel, copper, or zinc, such as are commonly used by engravers. Before using a plate its surface should be well cleaned; it should then be rubbed with a linen cloth dipped in a mixture of caustic soda and whiting, in order to remove any remaining trace of greasiness. The plate is then to be rubbed dry with another linen cloth. This process is then to be repeated; after which, the plate is in general sufficiently clean.

"In order to engrave a plate, I first cover it with a substance which is sensitive to light. This is prepared as follows:—About a quarter of an ounce of gelatine is dissolved in eight or ten ounces of water, by the aid of heat. To this solution is added about one ounce, by measure, of a saturated solution of bichromate of potash in water, and the mixture is strained through a linen cloth. The best sort of gelatine for the purpose is that used by cooks and confectioners, and commonly sold under the name of gelatine. In default of this, isinglass may be used, but it does not answer so well. Some specimens of isinglass have an acidity which slightly corrodes and injures the metal plates. If this accident occurs, ammonia should be added to the mixture, which will be found to correct it. This mixture of gelatine and bichromate of potash keeps good for several months, owing to the antiseptic and preserving power of the bichromate. It remains liquid and ready for use at any time during the summer months; but in cold weather it becomes a jelly, and has to be warmed before using it: it should be kept in a cupboard or dark place. The proportions given above are convenient, but they may be considerably varied without injuring the result. The engraving process should be carried on in a partially darkened room, and is performed as follows:—A little of this prepared gelatine is poured on the plate to be engraved, which is then held vertical, and the superfluous liquid allowed to drain off at one of the corners of the plate. It is held in a horizontal position over a spirit lamp, which soon dries the gelatine, which is left as a thin film, of a pale yellow colour, covering the metallic surface, and generally bordered with several narrow bands of prismatic colours. These colours are of use to the operator, by enabling him to judge of the thinness of the film: when it is very thin, the prismatic colours are seen over the whole surface of the plate. Such plates often make excellent engravings; nevertheless, it is perhaps safer to use gelatine films which are a little thicker. Experience alone can guide the operator to the best result. The object to be engraved is then laid on the metal plate, and screwed down upon it in a photographic copying frame. Such objects may be either material substances, as lace, the leaves of plants, &c., or they may be engravings, or writings, or photographs, &c., &c. The plate bearing the object upon it is then to be placed in the sunshine, for a space of time varying from one to several minutes, according to circumstances; or else, it may be placed in common daylight, but of course for a long time. As in other photographic processes, the judgment of the operator is here called into play, and his experience guides him as to the proper time of exposure to the light. When the frame is withdrawn from the light, and the object removed from the plate, a faint image is seen upon it—the yellow colour of the gelatine having turned brown wherever the light has acted. This process, so far as I have yet described it, is, in all essential respects, identical with that which I described in the specification of my former patent for improvements in engraving, bearing date the 29th October, 1852.

"The novelty of the present invention consists in the improved method by which the photographic image, obtained in the manner above described, is engraved upon the metal plate. The first of these improvements is as follows:—I formerly supposed that it was necessary to wash the plate, bearing the photographic image, in water, or in a mixture of water and alcohol, which dissolves only those portions of the gelatine on which the light has not acted: and I believe that all other persons who have employed this method of engraving, by means of gelatine and bichromate of potash, have followed the same method, viz., that of washing the photographic image. But however carefully this process is conducted, it is frequently found, when the plate is again dry, that a slight disturbance of the image has occurred, which, of course, is injurious to the beauty of the result; and, I have now ascertained, that it is not at all necessary to wash the photographic image; on the contrary, much more beautiful engravings are obtained upon plates which have not been washed, because the more delicate lines and details of the picture have not been at all disturbed. The process which I now employ is as follows:—When the plate, bearing the photographic image, is removed from the copying frame, I spread over its surface, carefully and very evenly, a little finely-powdered gum copal (in default of which common resin may be employed). It is much easier to spread this resinous powder evenly upon the surface of the gelatine, than it is to do so upon the naked surface of a metal plate. The chief error the operator has to guard against is, that of putting on too much of the powder: the best results are obtained by using a very thin layer of it, provided it is uniformly distributed. If too much of the powder is laid on it impedes the action of the etching liquid. When the plate has been thus very thinly powdered with copal, it is held horizontally over a spirit lamp in order to melt the copal; this requires a considerable heat. It might be supposed that this heating of the plate, after the formation of

a delicate photographic image upon it, would disturb and injure that image; but it has no such effect. The melting of the copal is known by the change of colour. The plate should then be withdrawn from the lamp, and suffered to cool. This process may be called the laying an aquatint ground upon the gelatine, and I believe it to be a new process. In the common mode of laying an aquatint ground, the resinous particles are laid upon the naked surface of the metal, before the engraving is commenced. The gelatine being thus covered with a layer of copal, disseminated uniformly and in minute particles, the etching liquid is to be poured on. This is prepared as follows:—Muriatic acid, otherwise called hydrochloric acid, is saturated with peroxide of iron, as much as it will dissolve with the aid of heat. After straining the solution, to remove impurities, it is evaporated till it is considerably reduced in volume, and is then poured off into bottles of a convenient capacity; as it cools it solidifies into a brown semi-crystalline mass. The bottles are then well-corked up, and kept for use. I shall call this preparation of iron by the name of perchloride of iron in the present specification, as I believe it to be identical with the substance described by chemical authors under that name—for example, see 'Turner's Chemistry,' fifth edition, page 587; and by others called permuriate of iron—for example, see 'Brande's Manual of Chemistry,' second edition, vol. ii. page 117.

"It is a substance very attractive of moisture. When a little of it is taken from a bottle, in the form of a dry powder, and laid upon a plate, it quickly deliquesces, absorbing the atmospheric moisture. In solution in water, it forms a yellow liquid in small thicknesses, but chestnut-brown in greater thicknesses. In order to render its mode of action in photographic engraving more intelligible, I will first state, that it can be very usefully employed in common etching; that is to say, that if a plate of copper, steel, or zinc is covered with an etching ground, and lines are traced on it with a needle's point, so as to form any artistic subject; then, if the solution of perchloride of iron is poured on, it quickly effects an etching, and does this without disengaging bubbles of gas, or causing any smell; for which reason it is much more convenient to use than aquafortis, and also because it does not injure the operator's hands or his clothes if spilt upon them. It may be employed of various strengths for common etching, but requires peculiar management for photoglyphic engraving; and, as the success of that mode of engraving chiefly turns upon this point, it should be well attended to.

"Water dissolves an extraordinary quantity of perchloride of iron, sometimes evolving much heat during the solution. I find that the following is a convenient way of proceeding:—

"A bottle (No. 1) is filled with a saturated solution of perchloride of iron in water.

"A bottle (No. 2) with a mixture, consisting of five or six parts of the saturated solution and one part of water.

"And a bottle (No. 3) with a weaker liquid, consisting of equal parts of water and the saturated solution. Before attempting an engraving of importance, it is almost essential to make preliminary trials, in order to ascertain that these liquids are of the proper strengths. These trials I shall therefore now proceed to point out. I have already explained how the photographic image is made on the surface of the gelatine, and covered with a thin layer of powdered copal or resin, which is then melted by holding the plate over a lamp. When the plate has become perfectly cold, it is ready for the etching process, which is performed as follows:—A small quantity of the solution in bottle No. 2, viz., that consisting of five or six parts of saturated solution to one of water, is poured upon the plate, and spread with a camel-hair brush evenly all over it. It is not necessary to make a wall of wax round the plate, because the quantity of liquid employed is so small that it has no tendency to run off the plate. The liquid penetrates the gelatine wherever the light has not acted on it, but it refuses to penetrate those parts upon which the light has sufficiently acted. It is upon this remarkable fact that the art of photoglyphic engraving is mainly founded. In about a minute the etching is seen to begin, which is known by the parts etched turning dark brown or black, and then it spreads over the whole plate—the details of the picture appearing with great rapidity in every quarter of it. It is not desirable that this rapidity should be too great, for, in that case, it is necessary to stop the process before the etching has acquired sufficient depth (which requires an action of some minutes' duration). If, therefore, the etching, on trial, is found to proceed too rapidly, the strength of the liquid in bottle No. 2 must be altered (by adding some of the saturated solution to it) before it is employed for another engraving; but if, on the contrary, the etching fails to occur after the lapse of some minutes, or if it begins, but proceeds too slowly, this is a sign that the liquid in bottle No. 2 is too strong, and too nearly approaching saturation. To correct this, a little water must be added to it before it is employed for another engraving. But, in doing this, the operator must take notice, that a very minute quantity of water added often makes a great difference, and causes the liquid to etch very rapidly. He will therefore be careful, in adding water, not to do so too freely. When the proper strength of the solution in bottle No. 2 has thus been adjusted, which generally requires three or four experimental trials, it can be employed with security. Supposing then, that it has been ascertained to be of the right strength, the etching is commenced as above mentioned, and proceeds till all the details of the picture have become visible, and present a satisfactory appearance to the eye of the operator, which generally occurs in two or three minutes; the operator stirring the liquid all the time with a camel-hair brush, and thus slightly rubbing the surface of the gelatine, which has a good effect. When it seems likely that the etching will improve no further, it must be stopped. This is done by wiping off the liquid with cotton wool, and then rapidly pouring a stream of cold water over the plate, which carries off all the remainder of it. The plate is then wiped with a clean linen cloth, and then rubbed with soft whiting and water to remove the gelatine. The etching is then found to be completed.

"I will now describe another etching process, very slightly differing from the former, which I often use. When the plate is ready for etching, pour upon it a small quantity of the liquid (No 1—the saturated solution). This should be allowed to rest upon the plate one or two minutes. It has no very apparent effect, but it acts usefully in hardening the gelatine. It is then poured off from the plate, and a sufficient quantity of solution (No 2) is poured on. This affects the etching in the manner before described: and, if this appears to be quite satisfactory, nothing further is required to be done. But it often happens, that certain faint portions of the engraving—such as distant mountains or buildings in

a landscape—refuse to appear; and as the engraving would be imperfect without them, I recommend the operator, in that case, to take some of the weak liquid (No. 3) in a little saucer; and, without pouring off the liquid (No. 2) which is etching the picture, to touch with a camel-hair brush, dipt in liquid (No. 3), those points of the picture where he wishes for an increased effect. This simple process often causes the wished-for details to appear, and that, sometimes, with great rapidity, so that caution is required in the operator, in using this weak solution (No. 3) especially, lest the etching liquid should penetrate to the parts which ought to remain white: but, in skilful hands, its employment cannot fail to be advantageous, for it brings out soft and faint shadings which improve the engraving, and which would otherwise probably be lost. Experience is requisite in this, as in most other delicate operations connected with photography; but I have endeavoured clearly to explain the leading principles of this new process of engraving, according to the method I have hitherto found the most successful."*

H. F. Talbot.

HISTORICAL SKETCH OF PHOTOGRAPHIC ENGRAVING.

As Mr. Fox Talbot's discovery has created considerable interest in the scientific world, a brief synopsis of what has hitherto been done would seem to be a fitting sequence to the full description we have given above.

The first who appears to have had any idea of heliographic engraving was Nicephore Nièpce. According to M. Aimé Girard the first proof taken by him by means of this process bears date 1827, some dozen years before the discovery of photography. This process, which is now almost forgotten, was very simple; it consisted in spreading a thin layer of bitumen of Judea upon a copper or pewter plate, which was then placed in the camera, where it was allowed to remain some hours, until it had received the impression of the external objects towards which the lens was directed. On withdrawing the plate it was submitted to the action of the essence of lavender, which dissolved the portions of the bitumen not acted upon by the light, leaving the metal bare, while the remaining bitumen reproduced the design. Passing the plate afterwards through an acid solution it was found that it had eaten hollows in the metallic plate, while the other parts were preserved by the protecting varnish. Such was the process that M. Nièpce revealed to Daguerre when he entered into a partnership with him. Nièpce died in 1833, after struggling twenty years, during which he spent his time and money in endeavouring to perfect his discovery, poor and almost unknown.

Six years later, that is in 1839, M. Daguerre made the discovery public. In the meantime he had considerably improved on Nièpce's process, but the discovery of photography led to the abandonment of the process for some years.

The next process to which we shall refer is that of M. Fizeau. He took a daguerrean plate and submitted it to the action of a mixture of nitric, nitrous, and hydrochloric acids, which did not affect the whites of the picture but attacked the blacks with a resulting formation of adherent chloride of silver, which speedily arrested the action of the acid. This he removed by a solution of ammonia, and the action of the acid was continued, and this process he continued until a finely engraved plate was the result; but the lines of this plate were not deep enough to allow of prints being taken from it; and to remedy this, he covered the plate with some drying oil and then wiping it from the surface, left it to dry in the hollows. He afterwards submitted the plate to an electro-chemical process which covered the raised parts with gold, leaving the hollows in which the varnish remained untouched. On the completion of the gilding this varnish was removed by means of caustic potash, and the surface of the plate covered with *grains de gravure* producing what is technically termed *aquatint* ground, and the deepening of the lines proceeded with by means of the acid. The daguerrean plate was by these means converted into an engraved plate, but as it was silver it would have worn out very soon; to obviate which an impression was taken on copper by an electro-chemical process, which could of course be renewed when it showed signs of wear.

On the 29th of Oct., 1852, Mr. Fox Talbot patented his process, which was somewhat similar to that which has been subsequently adopted by MM. Pretsch and Poitevin, as regards the substance first used—viz., a mixture of bichromate of potash and gelatine—but the remaining portion of the process was conducted on the same principle, though in a different manner, to that of M. Fizeau; but Mr. Fox Talbot's new discovery has so completely thrown his previous one in the shade that we need not describe it.

In 1853 M. Nièpce de St. Victor, the nephew of Nicephore Nièpce, took up his uncle's plan, and with the assistance of M. Lemaitre—who had also assisted his uncle—endeavoured to perfect it: but, though he modified and improved it, his success was not very great; it was always found necessary to have the assistance of an engraver to complete the plate.

After this many others, among whom may be enumerated MM. Lerebours, Lemercier, Barreswil, Davanne, and finally Poitevin, endeavoured to obtain a design by similar means on stone. The last appears to have succeeded. His method is based on the chemical reaction of light on a mixture of gelatine and bichromate of potash. This mixture, which when made is perfectly soluble in water, becomes insoluble after exposure to the light. His mode of proceeding is as follows:—He spreads the mixture on the stone, and after drying lays the negative upon it and exposes it to the light. After a suitable exposure the negative is removed, and the portions not acted upon by the light are washed away with water, and the design remains with the property of taking the ink like an ordinary lithographic crayon. The stone is then transferred to the press and proofs taken in the usual way. It is said that excellent pictures have been obtained from the stone after 900 copies had been pulled.

The process of M. Charles Négre, which at the present moment excites so much attention in Paris, is more complicated than the preceding, but yields superior results. His process appears to be not unlike that of M. Fizeau. He employs acids to eat the lines into the plate, and at a certain stage of the process it is submitted to the action of a galvanic bath which plates it with copper, silver, or gold, according to circumstances. By his process the half-tones are produced with more delicacy than by any similar one except, as we think, the new process of Mr. Fox Talbot. Our readers, however, will be in a position to judge for themselves when we are able, through the kindness of the latter gentleman, to present them with a print from a plate engraved by his process.

ON DRY COLLODION.

BY M. COLLARD.

The attention of most photographers has been for a long time past directed to the subject of dry collodion, and the numerous experiments and researches to which it has given rise prove the deep interest which is felt in this process. The inconveniences inherent in the employment of wet collodion in out-of-door operations are so numerous, as to render its use almost impossible. In fact, if we want to take a picture of a monument or a landscape, we require a tent, and so many other things, that it is difficult to move about with them; hence the reason why the questions of the preserved collodion and dry collodion have occupied so much space in photographic journals. We term those collodions preserved which are covered with a layer of gelatine, gum, or any similar substance. I have very little confidence in the different processes that have been described, the

* A photoglyphic steel plate is, through Mr. Talbot's courtesy, being prepared by him for the "Photographic News." We hope to present a proof from it with each copy of our next week's number.

results of which, in the first place, leave much to be desired, and have the further disadvantage of complicating the easy and simple operation of the collodion; if we must complicate the operation by other manipulations, it would be better to recur to albumen, or simply adhere to the Taupenot process, which, whatever may be said to the contrary, possesses indisputable merit. I have recently seen proofs obtained, by means of this process, by a very able amateur, M. Lejeune, of Vic-sur-Seille, and I sincerely congratulate him on the success of his labours, which redound as much to his credit as to that of the process.

The Taupenot method, like all other inventions, has had its defenders and detractors; generally, however, it was favourably received, inasmuch as it, at the same time, contented the partisans of collodion and those of albumen: the alliance of the two rivals was consummated, they joined hands, and agreed to journey together. Alas! this *entente cordiale* was not of long duration; the collodion, which had at first consented to take the first steps in the dry way protected by albumen, soon wanted to walk alone. Abbé Desprats, MM. Duboscq, Franck de Villecholles, Herman Krone, of Dresden, Clifford, of London, and, finally, M. Quinet, one after the other pointed out the virtues of dry collodion.

All collodion suitably iodised is capable of giving proofs by the dry method, especially after being strengthened with a slight dose of resin; the collodionised glass is sensitised in a bath of nitrate of silver at 6 per cent., then washed perfectly in two or three waters, and afterwards dried in darkness. MM. Robiquet and Duboscq use yellow amber instead of resin; but I prefer resin, as it dissolves more easily in collodion than amber. According to the Abbé Desprats the exposure in the camera is not much longer in the dry method than in the wet; but I do not share that opinion: experience has shown me that dry collodion is two or three times less sensitive than the wet collodion; but that is of little importance in my estimation, dry collodion being intended exclusively for the reproduction of inanimate objects.

An English photographer, Mr. Clifford, recommends the washing of the collodionised glass with common beer, containing 3 per cent. of nitrate of silver, and 2 per cent. of acetic acid. Mr. Clifford professes to preserve his glasses in this way for four or five days; but this method does not appear to merit any great attention: the argentiferous beer bath must, of necessity, leave on the collodionised glass free nitrate of silver, while it cannot be too often repeated, that one of the essential conditions of the success of the dry collodion is precisely the elimination of every trace of nitrate of silver by repeated washings. A very able operator, M. Herman Krone, of Dresden, holds an opinion diametrically opposed to that of Mr. Clifford. Not only does he thoroughly wash the collodionised glass on removing it from the silver bath, but he submits it to a solution of chloride of sodium at 2 per cent., the object of which is to change the nitrate of silver into chloride of silver insoluble in water; the glass is afterwards rinsed in several waters, and then left in darkness to spontaneous desiccation. In this way M. Krone preserves his glasses eight or ten days, and for two days they remain almost as sensitive as wet collodion. The proofs obtained by M. Krone are really admirable; I have seen views of Dresden and its environs, which are *chefs d'œuvre*. M. Quinet also took up the question of dry collodion, and the results he obtained from his experiments were really astonishing, both as regarded the quickness of the pose, and the beauty of the negative. When he presented his collodionised glasses to the French Photographic Society, one of the members present, himself a distinguished photographer, expressed doubts as to the success of the process when applied to glasses of large dimensions. I am in a position to reassure both him and the partisans of the dry collodion in this respect. I was present with M. Quinet when he repeatedly took views of the Hotel de Ville on glasses of 60 centimeters, using for the purpose a simple object glass of 6 inches, with a focus of 1m. 45s., and furnished with a diaphragm of 2 centimeters diameter; the weather was dull at the time, yet the proofs were obtained in about 5 minutes....

One question which has not been settled is, whether it is or is not necessary to wash the dry collodion glass on removing it from the camera; I have tried both methods, without finding any great difference in the results; only by soaking the glass with water before covering it with the developing solution, cloudiness, streaks, and spots are avoided.

Another question:—Ought the glass to be plunged in the nitrate bath before developing it? is a point upon which photographers are not agreed; for my part, I consider it an absolute necessity. Without doubt the dry collodion process remains to be developed and perfected; such as it is at present, however, it is capable of rendering great services; and I would recommend photographers to adopt it in preference to the albumen and other mixed processes.

ON THE EMPLOYMENT OF NITRATE OF URANIUM IN PHOTOGRAPHY.

BY M. CRESPON.

A PASSIONATE admirer of photography, I follow with the greatest interest all the improvements which are introduced from day to day in the processes of this marvellous art. . . . .

All those who saw the proofs obtained with the nitrate of uranium were struck with the delicacy and the faithfulness with which the original was rendered, and with the harmonious gradations of the light half tones; and some fancied that there was nothing more to discover, and that chlorides, hyposulphites, and innumerable washings were no longer required. . . . Unfortunately the process leaves much to be desired, especially on the score of stability; and if the reactions necessarily produced be considered, it will be perceived that it could not be otherwise; for, leaving out all theoretical explanations of the part played by the nitrate of uranium in this process, it cannot be disputed that the action of the light greatly modifies its molecular constitution, and perhaps its composition, since the picture on being withdrawn from the frame is entirely formed, and in part visible.

There is more in this than a simple absorption of light, the *rôle* of the nitrate of uranium is not purely passive; and it may be hoped that among the numerous metallic salts, other than those of silver, platinum, and gold, one will be met with which will admit of deoxidation on contact with the modified nitrate of uranium, and produce the complete development of the picture.

If we admit that nitrate of uranium in presence of organic matters may be decomposed by the action of the luminous rays, and that a part of its acid, being eliminated, leads to the formation of a neutral or basic nitrate, almost if not quite insoluble, it is evident that mere washing in water cannot carry away the portion of the salt held in the pores of the paper. Besides, the immersion in the nitrate of silver must necessarily produce insoluble salts, such as chlorides and carbonates, which, being precipitated in the pores of the paper, water cannot wash off. That this is so, the subsequent action of the light evidently demonstrates, as this affects only the whites of the proof, the blacks, it is to be hoped, being beyond alteration; this, however, time alone can prove. Oxide of silver is far from possessing an absolute stability, and it may be that a part of the inconveniences attributed to the use of the hyposulphite of soda, results from the slow reaction of accidental impurities in the paper on the compound of silver, which forms the blacks of the picture obtained by the chloride of that metal. . . .

It has been stated that uranium proofs resist boiling cyanide of potassium; I have found them yield to this solution, even when cold. . . .

I extract the following notes from my register of observations on the experiments I have made with uranium:—

The sheets prepared with 20 per cent. of the nitrate of uranium in water, and floated ten minutes on this solution, are in good condition for obtaining fine and vigorous positive prints. This bath is good until exhausted. It is not so when gelatinised paper is used, for after a small number have been submitted to it, the uncoagulated gelatine gradually dissolves in the uranium bath, and in the end prevents the certain and equal preparation of the papers, and thus leads to the loss of considerable quantities of this salt. There are plenty of methods of coagulating gelatine, such as a gallic acid bath; but these substances colour nitrate of uranium a reddish brown, and, besides, tend to make the process more complicated. It therefore only remains for those photographers who desire to avail themselves of the good results offered by the employment of gelatine, to do so at as small a sacrifice as possible of nitrate of uranium. This will be best accomplished by pouring upon a glass the exact quantity required for each sheet of paper; and by following the method of M. de la Blanchère in the other operations, very nice proofs will be obtained, which would leave nothing to desire if they were only permanent. But unfortunately they are not, and to assure one's-self of this, it is only necessary to expose half of one of these pictures to the sun, while the other half is screened from it: after a few hours' exposure the difference in the appearance of the two halves will be very perceptible. These alterations arise from salts that the rapid washings have not been able to dissolve; while, on the other hand, if the washings be prolonged, the paper becomes spotty. It is necessary, therefore, to find a fixing solution which will enable this process to give all the good results it promises. The plan I have found to succeed best is the following: on taking the proof from the frame, and after passing it through the silver bath, and giving it three or four washings, I put it on a chloride of gold bath, or better a bath of sel d'or or hyposulphite of gold of Fordos and Gélis; and after toning the proof, I *pass* it through a feeble hyposulphite of soda bath: by this means the little chloride or other insoluble salts that have formed are removed. The exposure of the proof to the hyposulphite of soda ought not to be prolonged, for this would be to fall into the drawbacks of the old process. It must be afterwards washed in three or four waters, and then left to soak, in a considerable quantity of water, for two hours.

The pictures treated in this way had gained greatly in stability, for though exposed to the sun during the whole of a long day in June, they were in no way altered. As to the hyposulphite of soda, we have in this case nothing to fear from its destructive effects, since it merely acts as a solvent, and the reactions arising from its prolonged contact with large quantities of chloride of silver cannot be produced.

Proofs that have undergone a too prolonged exposure to the sun may be brought back to very soft and harmonious tones, by prolonging the stay in the hyposulphite of soda. I must also observe, that there is a great advantage in toning the proof in the *sel d'or* before submitting it to the hypo., for, if the proof be plunged into the latter bath on being withdrawn from the nitrate of silver, it loses much of its vigour.

As regards the silver bath, it frequently alters and gives only incomplete proofs. I attribute the cause, not to the exhaustion of the nitrate, but rather to the accidental formation of foreign salts, which change its effects and nature.

Another remark worthy of attention is, that with negatives which are feeble or too uniform it is difficult to obtain satisfactory positives; and it is more especially when commercial nitrate of silver is employed, that we are exposed to this annoyance, which, moreover, is just as likely to happen in the chloride of silver proofs, as in the silver baths which serve to make the negatives on collodion. Fused nitrate of silver tends on the contrary to exaggerate the opposition of the lights of the negatives, and it is by a judicious choice of these nitrates, or by their mixture in different proportions, that we may derive the best possible results from negatives notably different in intensity. . . . .

The use of bi-chloride of mercury has not given me the satisfactory results I expected from it; its corroding action destroys the harmony of the half-tones, and, besides, the duration of the exposure is much too long. I owe to one of my chemical friends the idea of substituting for chloride of mercury, a nitrate of the same base, employed in a somewhat different manner. On withdrawing the proof from the silver bath, I pass it on a concentrated solution of nitrate of mercury, when it acquires tones of an unexpected richness, and at the same time completely preserves the whites

Photographic Chemistry.

NATURE OF THE METALS.

(Continued.)

All the metals enumerated above form combinations among themselves or with non-metallic bodies. Their combinations with each other are for the most part little known; they are badly defined and in variable proportions; they have received the generic term of alloys, with the exception of the alloys with mercury, which are termed *amalgams*. In uniting with non-metallic bodies, metals form definite compounds; those united with any non-metallic body other than oxygen have received the name of *mineral salts;* among these are included chloride, bromide, and iodide of silver; salts that are formed by a combination of silver with bromine, iodine, and chlorine. Before we proceed to remark on the nature of *salts* generally, we will offer a few observations on the oxides formed of different metals which enter more or less directly into photographic operations. To begin with that commonly considered the most precious—gold; this metal combines with oxygen in at least two proportions, forming protoxide and peroxide of gold. To form the protoxide 4 parts of oxygen combine with 100 of the metal; to form the peroxide 12 parts of oxygen combine with 100 of gold. When 100 parts of gold have combined with 4 of oxygen the mass, after a short time, undergoes decomposition, and one-third of it deprives the other two-thirds of its share of the oxygen, which is therefore reduced again to its original state of metallic gold. It combines with chlorine, iodine, bromine, sulphur, and phosphorus. A portion of this metal dropped in a mixture of nitric and muriatic acids dissolves with effervescence, and the result is chloride of gold, the substance so extensively used for toning photographic pictures. In the event of any of our younger readers trying experiments with the oxides of gold and acids, we will inform them that the peroxide dissolved in muriatic acid and precipitated with ammonia forms a detonating powder which explodes if rubbed.

The metal which of all others is of the most importance in photography is *silver*. It combines with oxygen, and the resulting protoxide combined with nitric acid gives nitrate of silver. This metal also combines with chlorine to form chloride of silver; with iodine to form iodide of silver; with bromine to form bromide of silver; and also with sulphur selenium and phosphorus.

Iron in some of its numerous combinations enters largely into photographic operations. Its lowest combination with oxygen produces protoxide of iron, a substance composed of 100 parts of the metal, and 28·572 of oxygen; this, exposed to a red heat, absorbs half as much more oxygen, forming peroxide of iron, which is, therefore, formed of a combination of 100 parts of the metal, with 42·857 of oxygen To reduce peroxide to protoxide, it is only necessary to heat it to whiteness. This metal is generally found as an oxide; and very commonly combined with sulphur. This sulphuret of iron is termed iron pyrites. When combined with nickel it is identical, or nearly so, with what has been termed *meteoric iron*, immense masses of which have been discovered at different times; one of which, described by Professor

Pallas, was found on the top of a mountain in Siberia, that weighed nearly 1,600 pounds. Another mass was found in South America some years ago, that weighed about 30 tons: and, in the Imperial Museum, at Vienna, there is a mass of this metal, which was *seen* to fall from the atmosphere. Iron, united with chlorine, forms a chloride; but the combinations in which this metal enters, that are most interesting to photographers, are those with sulphuric acid, with which it combines in different proportions; of which we need only mention two,—the sulphate of protoxide of iron, and the sulphate of peroxide of iron. The former substance (known in commerce as green vitriol) is formed of a combination of protoxide of iron and sulphuric acid. As a reducing agent, it is a good deal used in photography, and a weak solution of it is used to develop collodion pictures; it absorbs the oxygen of the atmosphere with great rapidity; and forms an insoluble basic sulphate of peroxide of iron, and a similar neutral sulphate which remains in solution, the presence of which, however, does not appear to have any prejudicial action on the reducing properties of the sulphate of protoxide. The second salt, the sulphate of peroxide, is formed of 1 equivalent of peroxide of iron, and 3 equivalents of sulphuric acid. It can be prepared by adding nitric acid, and afterwards sulphuric acid, to a solution of sulphate of protoxide of iron, and evaporating this liquid to dryness; the yellowish-white residue is the substance under consideration; this dissolves in water, to which it gives a brown tint, and a solution of it is sometimes used for fixing collodion proofs; a process it accomplishes by destroying the sensibility, and not by dissolving the sensitive body.

Copper combines with chlorine, and the result is a chloride, and also with bromine and iodine, forming analogous salts: it also combines, in different proportions, with oxygen, forming a suboxide and a protoxide; and a sulphuret can be obtained by heating copper filings with sulphur; but, as none of its compounds are used in photography, it will not be necessary for us to describe them.

Lead is one of the softest metals; it melts easily, and, if continually stirred when fused, it absorbs oxygen, and is converted into an oxide. It combines with oxygen in three different proportions; 100 parts of the metal, combining with 7·692 of oxygen, forms the protoxide; the combination with 11·538 of oxygen, the deutoxide; and the combination with 15·384 of oxygen, forms peroxide of lead. The oxidation yields the substances known in commerce as massicot, litharge, and red-lead. Lead is easily acted upon by various liquids; nitric acid, even when diluted, attacks it rapidly; and it is also oxidised by some spring waters, and especially by distilled water, in contact with the air. Like the preceding metal, it is of little present use to photographers.

Tin is another metal of no present value to photographers; it combines with many substances, viz., oxygen, chlorine, iodine, bromine, phosphorus, sulphur, and fluorine. It forms two oxides; the protoxide, consisting of 100 parts of metal, combined with 13·793 of oxygen; and the peroxide, which, with 100 parts of the metal, combines 27·586 of oxygen.

Zinc is a metal which, like tin, is never found native, but always in combination with oxygen, sulphur, or some other substance. It combines with chlorine, and is set on fire by that gas; it also unites with phosphorus, sulphur, iodine, and selenium. Heated to a red heat in the atmosphere, it becomes volatile; but the vapours combine with the oxygen, and condense in flakes of such exceeding lightness, that it was formerly termed "philosophical wool," and "white nothing;" this powder is the oxide of zinc. Zinc decomposes water with facility in the presence of an acid; it takes possession of the oxygen, and liberates the hydrogen, a property which chemists take advantage of for obtaining hydrogen, and also for reducing the chloride of silver, and restoring it to a metallic state. The levigated zinc white is also used for polishing glass plates.

(*To be continued.*)

Dictionary of Photography.

Acetate.—Salts formed by the union of acetic acid with a basic oxide are called acetates; thus acetic acid and potassa (oxide of potassium) unite and form the salt acetate of potassia, acetic acid and oxide of silver unite and form acetate of silver. All acetates dissolve in water, most of them readily. Their dilute aqueous solutions decompose on standing, with formation of carbonates and mouldy substances; the alkaline acetates are especially liable to this decomposition. When mixed with dilute salts of the peroxide of iron, the yellow colour is changed to red. When added to a solution of nitrate of silver, they throw down delicate white shining scales of acetate of silver.

Acetate of Ammonia is very difficult to prepare or keep in the pure state, owing to the tendency which it has to form an acid salt. When required in photography, it is invariably prepared by mixing ammonia and acetic acid together until the liquid is neutral or only slightly acid to test paper.

This salt has been recommended by M. Humbert de Molard, for hastening the development of the negative in gallic acid. Its action is to continue the change commenced by light, but unless great care be taken, the proof is very liable to darken all over. However, in some cases, with caution, very good results can be obtained by its means, when it is desired to develop rapidly.

Acetate of Iron.—Mr. Hardwich has recommended this salt of iron for developing collodion negatives under circumstances where lowness of temperature or other retarding causes would prevent the full and complete action of pyrogallic acid. Indeed, its powers of rendering the detail in shadows with distinctness without over-doing the lighter portions is so great, that it is not unlikely, that the employment of this salt as a substitute for pyrogallic acid, would be attended with a marked advantage in many cases, especially where it is desired to copy paintings or similar subjects.

The following formula is recommended :—

Sulphate of iron	12 grains.
Acetate of lead	12 "
Beaufoy's acetic acid	1½ drachm.
Water	1 ounce.

The acetate of lead and the acetic acid are to be dissolved in half of the water, and the sulphate of iron in the other half. Add the two together, allow the whole precipitate of sulphate of lead to settle, and then decant or filter off the clear liquid for use.

Another formula, easier to make, and giving almost equally good results with the above, is as follows :—

Sulphate of iron	12 grains.
Acetate of soda	6 "
Beaufoy's acetic acid	1½ drachm.
Water	6½ "

These are to be simply mixed together, and when the acetate of soda and sulphate of iron are dissolved, the mixture will be ready for use.

It is advisable that, in using this developer, the solution be not allowed to remain longer on the film than is really necessary, as otherwise there will be danger of an appearance of fogging in the shadows of the picture. The plate is also more sensitive to diffused light in either the operating room or camera. The

solution must also not be poured in a stream on one part of the plate, but must be allowed to flow gently but rapidly across from an edge or corner, by placing the mouth of the glass containing it almost touching the plate, otherwise the nitrate of silver will be washed away from that part of the surface of the plate upon which the developing solution falls, and a spot of very feeble development will be the result. If the temperature be high, the action of the above solutions will be too energetic, and water must be added.

Acetate of Soda is obtained by neutralising acetic acid with carbonate of soda, and then evaporating,—or by precipitating acetate of lead with carbonate of soda, filtering the solution from the precipitated carbonate of lead, separating the slight quantity of lead which may still remain in the liquid by means of hydrosulphuric acid, and evaporating the solution till it crystallises, which it does in oblique rhombic prisms. The salt dissolves readily in water, and is frequently employed in photography for the purpose of replacing a strong acid, such as nitric acid, by the weaker acetic acid; nitric acid having a stronger affinity for soda than is possessed by the acetic acid, unites to that base, and the acetic acid becomes free.

For the employment of acetate of soda as an accelerating agent, *see* Accelerator (*ante*).

(*To be continued.*)

A Catechism of Photography.

IV.—GENERAL PRINCIPLES OF PHOTOGRAPHY.

(*Continued.*)

Q. What is that force described in the last hypothesis called?

A. *Molecular attraction.*

Q. What is the cause of molecular attraction?

A. We are at present unacquainted with the cause of this attractive force; it is one of the physical phenomena of chemistry, but its origin is involved in obscurity. The appearance of the photographic image on a metal plate, paper, or glass in the developing process belongs to this class of phenomena. The light imparts to the sensitive surface an attractive force, and the agents which are employed in the development of the picture produce the molecules which obey that attractive force.

Q. What distinction exists between the hypotheses advanced?

A. In the first two a direct chemical effect is said to take place on the sensitive surface; in the third we have no apparent physical influence exerted, but the application of the reducing agents produces precisely similar effects as in the other cases.

Q. Explain more fully this molecular action.

A. When the reducing agents are brought to bear on the nitrate of silver, that nitrate is decomposed, the molecules of the silver are set at liberty, and settle upon those parts of the sensitive surface which have been operated upon by the action of light; that action which is invisible to us is detected by the molecules of silver, which group themselves, so to speak, on the parts thus affected.

Q. Is the action of the light on the sensitive surface more intense at one part than at another?

A. It is, and this is illustrated in the development of the picture, and completely bears out our last hypothesis.

Q. In what way?

A. We observe when the deposit of molecules is forming, the attracted force is in proportion to the decomposition which has taken place, and the high lights are consequently much more rapidly developed than the half tints, as the action of the light has been more intense, and the consequent accumulation of the molecules of silver is much greater. Where the reducing agent is very energetic, as the sulphate of protoxide of iron, the picture is more rapidly developed, but with less distinction and brilliancy than when developed by the gallic acid. The reason of this is, that the silver, being more rapidly reduced, settles all over the picture, obscuring the half tints, and failing to bring out effectively either the bright lights or deep blacks of the picture. In the second instance, where the gallic acid is employed, the silver is gradually liberated, and slowly settles on the most prominent parts of the photograph, effectually bringing out all its lights and shadows.

Q. To return from these hypotheses, what distinction is there generally made as to the action of light on sensitive surfaces?

A. There is a distinction made between total and partial action. The first is where the picture is visible, and requires no developing process; the second, where it is invisible when removed from the camera, and has to be developed by another process.

Q. What have we chiefly to consider in the latter instance?

A. The action of the light, and the action of the reducing agents.

Q. What is known as to the action of light?

A. The action of light on the sensitive surface is not known with any degree of certainty. As we already noticed, three hypotheses are held respecting it:—1st, That the light produces a *real* though invisible effect on the salt of silver; 2nd, that the molecules which compose the silver are separated, and that the reducing agent completes the separation; 3rd, that it exercises on the sensitive surface an unknown physical influence.

Q. What is known as to the action of the reducing agents?

A. The reducing agents complete what the light has begun; they develop the picture, by depositing a precipitate of silver (on the theory of molecular attraction) on those parts which have been affected by the action of light.

(*To be continued.*)

Correspondence.

PORTABLE CAMERA AND DEVELOPING BOX.

FROM MR. T. BARRETT, REIGATE.

Dear Sir,—I now send you a description of the apparatus I have constructed, and used with success, for taking stereoscopic collodion negatives without a tent or dark room. The apparatus is all contained in a case 12 inches high, 12 long, and 7 broad,—to be made of the black glazed cloth used for umbrella cases,—with two buckle straps round it, through which another strap may be passed to carry over the shoulder, or a piece of wood by way of handle, to carry by hand. The case must have a foundation of thin wood. Pack inside this two cases made of the same material. Let it also contain the brass ring for the tripod stand, two gutta percha bottles, one for water and the other a small one to contain a saturated solution of hypo.; also a small strap to carry the bath box (when moving only a short distance), and one or two cloths. No. 1 of the last-mentioned cases is 11 inches high, 4¾ long, 7 broad, and contains:—1. The camera; 2. Plate box (in the camera); 3. Shutter to slide into the back of the camera after the object is focused (Fig. 1); 4. The focusing glass in a frame, set in the centre of a piece of wood which is exactly the width of the cell on the top of the camera; 5. A piece of wood shaped as 5 in Fig. 1, with two pegs to fit into holes at the bottom of the camera, serving as a stop to keep the centre of the plates and of the focusing glass in the centre of the lenses. It must be covered with a piece of thick bibulous paper wrapped round it, or the plate will be stained by touching it; 6. A thin piece of

wood that slides into grooves, cut from the back to the front of the camera, in the centre of the top and bottom, to separate the lenses. Care must be taken that the groove into which the back shutter falls, is deeper than this groove, or the light would pass through it. To pack the plate box in the camera,

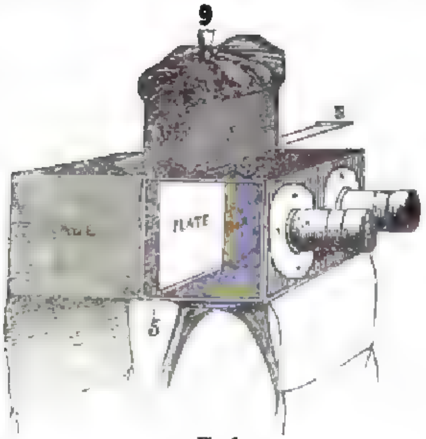


Fig. 1.

this thin piece of wood (6) and the piece (5) take out. No. 2 case is 11 inches high, 5 long, 7 broad. It contains:—7. Box containing the baths; 8. Dark chamber; 9. American clip, which must have a strong piece of india-rubber round it to make it clip tightly. Both lenses may also be packed in this case, or one may be carried separately to make it lighter. The lenses are double combination, and stops for them of different diameters may be carried in a small pocket at the side of No. 1 case. Two small pockets in this (No. 2) case contain a small bottle of collodion, and separate pieces of cloth to wipe the tops of the baths if found wet on removing the covers. Figure 1. The camera (section). It is not to be taken out of No. 1 case when in use, the portion beyond the back serving to screen the light in focusing. It is drawn in the figure as in use. It is $5\frac{3}{4}$ inches long, $4\frac{1}{2}$ high, $6\frac{3}{4}$ wide (outside measure), made of $\frac{1}{4}$ inch mahogany; a cell must be cut out at the top of the camera across the width for the projecting piece (*b*) of the dark chamber to fit into; it should be $5\frac{7}{8}$ inches long and $\frac{7}{8}$ wide, and the centre of it $4\frac{1}{4}$ inches from the front of the camera; the raised back of the piece of wood (5) should come exactly under the centre of it. The camera is open at the back that the plate box may pack inside it,—one half of the front must be made to slide in after its lens is screwed into it. My lenses are 8 inches apart from centre to centre. The plate box is $8\frac{3}{8}$ inches high, with the lid. The grooves for the plates must not come beyond 3 inches of the top of the box, that the wet collodion end of the plates when put in may be above the grooves and not be rubbed at the edges; it is made to contain 12 plates (patent plate), and must fit inside the camera. The plates are $7\frac{3}{4}$ inches long, by $5\frac{3}{8}$ wide, and must be scratched across 3 inches from each end, to prevent the collodion slipping. The box for the baths (Fig. 2) is $6\frac{1}{4}$ inches high without the lid, $7\frac{1}{4}$ by $4\frac{3}{4}$, the lid to fasten with hooks. It has two pieces cut out at the bottom, *a b*, exactly the size of the baths, and a false bottom inside, which, when the box is reversed, falls down on to stops, that the baths when placed in their respective cells may rest on the false bottom, so that the tops when the covers are removed may be exactly level with the (then) top of the box—the box being reversed. The baths are the water-tight gutta percha (Burgess and Key's), and are 4 inches deep, $\frac{7}{8}$ths of an inch wide, and 6 long, and the projecting piece (*b*) of the dark chamber must exactly fit them. The baths and covers should be marked S and D, and the same outside the box, to prevent using the wrong bath.*

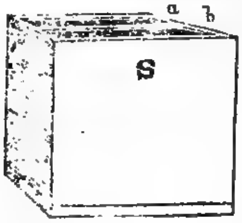


Fig. 2.

STRONG NEGATIVES FROM FAINT GLASS POSITIVES.

Sir,—The answer requested by yourself and correspondent in your last week's number, p. 57, viz., how to make transparent copies on glass from faint positives, will be found pretty fully treated in my letter of last Wednesday, by this time, I hope, safely arrived.

I have not much therefore to add, but can at least assure your correspondent that the desideratum he proposes is perfectly practicable, viz., that anything visible on a collodion positive by reflected light, *i. e.*, an excessively weak negative by transmitted light, may, by the camera process described in my last, be copied without sensible loss of definition, and without change of size, into a *transparent* positive of much power, fit either for the stereoscope or the magic lantern; and that then, by a similar proceeding, this transparent positive may be copied in its turn into a second negative, with any amount of intensity for printing on paper; and these proofs from the second negative will still retain so much definition, as to repay examination with the magnifying glass. Let no one therefore urge against a collodion positive (by reflected light) that it does not admit of multiplication; for, with the intervention of those two copying steps, it is not only enabled to turn out a good printing negative, but will turn out any number of similar negatives, so that we may have a dozen proofs printing at once from as many negatives, all of the same original glass positive, containing a record perhaps of some fleeting impression, too momentary to have allowed of a strong original negative being taken in the camera.

All this is possible, and I have done it; but many refinements are needed to do it well. First, the camera:—The lens may be the same as that by which the first picture was taken, the camera box being lengthened to double its former focus, and the picture to be copied placed at an equal distance in front of it; but a special form of lens for this sort of copying has been made, which will give better definition. Some trouble must be incurred in causing the optical image of the first picture to fall on, and exactly fit, the ground glass for the second; but the apparatus, once arranged, will suit any number of succeeding cases. If the picture is stereoscopic, one of the pictures only must be copied at a time, the glass being held in a small frame, sliding in grooves transversely to the optical axis, so as to allow of, first one, and then the other picture, being brought in front of the lens.

If we now look through the photograph to be copied, it is, to the eye, an excessively weak negative, and the numerous details visible when it was before viewed as a positive are gone, that is, gone to the human or optical eye; but not so to the photographic eye of the collodion plate, that sees them still, and presently renders them so that they are manifest to all. With this excessive sensibility, however, to delicate shades, it is necessary that the original photograph, though it be faint, should be clean, and even without blotches from unequal development, or spaces of washing away of the reduced silver by too much ablution, for all these faults will be terribly intensified. Then again, spots, holes, hairs, dust, &c., will of course be copied, and on the second negative we shall have its own dust spots, the dust spots of the original faint negative, the dust spots of the transparent positive. Hence, the more the first formation of any dust spots can be guarded against, the better, and one mode of decreasing them is, not to varnish the pictures undergoing the copying process. They do not need the varnish, for they are exposed to no mechanical action, as in copying by superposition, and every varnishing adds one, or more, sometimes many more, dust spots to the

* The remainder of our Correspondent's letter will be given in the next number.

plate. Good wet collodion, when there is absolutely no fogging, is perhaps the best material for working with in this process; but of late, when I have not succeeded in this devoutly-to-be-desired consummation, I have been trying dry collodion plates with unexpected satisfaction; their lights were very clear, their shadows intense, their manipulation easy and quick, and, in a box of a dozen plates, there was not a single bad one.

Edinburgh, October 12th, 1858. C. P. S.

PATENTS FOR DOUBLE PRINTING.

SIR,—If a certain process has been practised by several persons for some years, and if that process be afterwards patented by another, does that patent hold good? I put this question, because, in your last, appears a paragraph extracted from the *Mechanics Magazine* relating to a patent taken out by Mr. Sarony, of Scarborough, for printing from various negatives. This system has been in use for many years. The first description of it, I remember, appeared in the *Photographic Journal, September 21st*, 1855, by Berwich and Annan; it has also been carried out very successfully by Mr. Rejlander, Mr. Robinson, and others, as you are well aware.

I have not seen any specimens of Mr. Sarony's wonderful new invention, but I have heard that its chief value, as applied or misapplied to portraits, is, to put an old head on young shoulders; the head being taken from the person to be represented, the body from another person, and, perhaps, the hands from another. It is related that Zeuxis, some two thousand years ago, painted his famous picture of Helena from five of the most beautiful virgins the town of Cratona could afford, "uniting all the most admirable parts in one single figure;" and Zeuxis was right: but it is pushing ideality too far, to make a photographic representation of one person from various models, *and patent it*.

LUX.

Miscellaneous.

PHOTOGRAPHIC COPIES OF BANK NOTES PREVENTED.—Recently several attempts to counterfeit bank notes by means of photography have been successful; and this fraud has not been confined to bank notes—other valuable documents having been copied in a similar manner. It was thought that this kind of fraud was rendered impossible by printing the documents referred to in ink of two different colours, so that photography should reproduce them both in black. It was soon found, however, that while black ink, which has carbon for its basis, remained unassailable by any chemical reagent, the ordinary coloured inks could be easily removed from the paper, and a photographic copy then taken of the remainder. A subsequent operation was employed for printing in the coloured ink, upon this paper, that portion which had been expunged from the original. It is obvious, therefore, that what was wanted was a coloured ink capable of resisting all chemical agents; and this, it is said, has been found by Mr. George Matthews, assisted by Dr. Sterry Hunt, of Montreal, by calcined oxide of chromium, a substance of a fine green colour, which, manufactured into an ink, known as "Canada Bank Note Tint," is used for printing a geometrical design on the ground of the bank note, upon which the value and denomination is afterwards impressed in black ink in the usual way. This method of printing bank notes is now in extensive use in Canada and the United States. The process has been patented in England.

SENSITIVENESS OF IODIDE OF SILVER TO LIGHT.—M. Ed. Fortin has published some remarks on the sensibility of iodide of silver; he says:—"It is now a well-known fact that, for iodide of silver to be sensitive to light, it must necessarily have been prepared with an excess of silver; in this condition, if an excess of iodide be added, all sensitiveness disappears; the same is the case with bromides, chlorides, &c., of the same metal; the sensitiveness returns when the requisite excess of silver is added. But what is more curious and less known, although in conformity with the theory which led to my discovering it, is, that a layer of sensitive iodide, or of bromo-iodide of silver upon paper or glass, exposed to either diffused light, or to that which emanates from a lens, not only loses all sensitiveness in an iodide bath, but also all traces of the impression caused by the light. Thus, when a collodionized glass, or a sheet of prepared paper has been sensitized, and exposed in a camera for the time necessary to obtain a proof, if, instead of developing it, it be placed for an instant in an iodide bath, the action of the light upon it is annihilated, and it may be sensitised anew, and a fresh impression may be obtained upon it without any trace of the first picture being visible on development: the plate behaving precisely like a new plate which has never been used."

Photographic Notes and Queries.

THE ALABASTRINE PROCESS.—COLLODION POSITIVES ON CLOTH.—VIGNETTE POSITIVES.—BACKGROUND WITH LIGHT CENTRE.

SIR,—Allow me to congratulate you on again coming before the public as the editor of a first-rate journal which is, like "Fothergill's Process," the best out.

No doubt some of your readers are, like myself, fond of anything new, so I should like to mention a few dodges, which perhaps a great many don't know, and many do.

I see a deal about the alabastrine process for glass positives, which produces exquisite whites. It is said they have not the unpleasant blue cast of those done by *the* chloride of mercury process. But it is evident, from the yellowness of the iodide of silver left undissolved on the edge of the plate, that they are done by *a* chloride of mercury process. After fixing the positive, wash away the cyanide and soak in hot water to free it from all traces of that reagent; drain, place on a levelling stand, and pour on re-developing solution composed of 1 ounce water, 20 drops saturated solution of bichloride of mercury in muriatic acid, 20 grains protosulphate of iron, 12 grains nitrate of potash, ½ drachm alcohol, and allow it to remain on five or ten minutes until the desired effect is gained.

Taking direct positives on oil cloth, &c. This may be done by fastening the oil cloth to a glass plate with white wax, and proceed by cleaning, &c., in the usual way. If the oil cloth be of inferior quality, the warp and shute showing prominently through the blacks, coat it with a varnish made of mineral naphtha, asphaltum, and Indian rubber dissolved in bisulphide of carbon, and allow it to dry before coating with collodion, &c. Card may be used in the same way by coating one side with gelatine, Iceland moss, or any other substance, to prevent the varnish from soaking through. Some prefer transferring the film in order to get the rights and lefts correct. The quickest way to do this is to use a thick collodion giving a very skinny film, and take the picture. After fixing and washing lay the plate in a dish of water—slightly acid with sulphuric acid—and in a short time the film will be seen floating above the plate. Get the plate under the film, allowing a little to hang over one edge, and lift it out of the dish. Hold the plate in your left hand and take the oil cloth in your right and rub it on your trowsers until it is warm, which will cause it to expand, then lay it on your film, work out all air bubbles with your fingers, and separate the oil cloth from the glass at the end where the film hangs over.

There are many ways of vignetting paper positives besides using vignette glasses and apparatus between the camera and object. A vignette glass may be made by pasting an oval piece of black paper on a piece of white, and taking a negative with the lens out of a focus. A vignette portrait may be made by cutting a hole in a piece of millboard and holding it over the pressure frame whilst printing and keeping it gently in motion to prevent its printing the outline hard. Or lay the above millboard on the pressure frame and place cotton wool all round the inner edge so as to go thinner towards the centre. A good way is to get a

broken passe-partout, minus the glass, and paste a piece of wet tissue paper on the back, so that when dry it will be tight like a drum. When dry take a brush and some gamboge and paint all round the edge; then take Indian ink and stroke off towards the centre, to give the required effect, and lay it on the frame whilst printing, which will take very little longer, from the light coming through the paper.

Some wish to get a white place behind the head. To do this you must paint the background of your negative the same as for positives, so that no light can get through it, by grinding raw umber with drop black, and flake white with gum arabic and water, brushing it on wet. Print two pictures and cut the first one out round the figure, and allow it to blacken in the light, then take the one cut out and lay it on the other, so that the light will not injure it, and expose in the pressure frame with a piece of cotton wool over the place intended to be white, and keep it gently moving to give the proper gradation of shade; or cover the whole with a piece of black paper, and lift each corner alternately to allow the light to get under the sides as far as required. A print from a negative of this description may, on being covered up, have another negative of a landscape, &c., laid on to print background. SAPIENT.

[We are much obliged to "Sapient" for his letter, and shall be pleased to communicate any more of his ingenious "dodges" to our readers.]

NEUTRALISING THE NITRATE BATH.—CHLORIDE OF CADMIUM.—POWDERY PYROXYLINE.—POSITION OF THE STOP IN A LENS.

SIR,—In using oxide of silver to neutralise a nitrate bath containing acetic acid, I have produced a quantity of *snow-like* crystals (acetate of silver, I suppose) which remain floating in the bath, and, of course, render it useless; can it be made all right again? I have about 20 ounces of it. I have tried to make collodion as recommended at p. 35, but I cannot make chloride of cadmium dissolve. I have tried various means, dissolving them separately, and then mixing, and also triturating them together in a mortar, but all to no purpose; I got nothing but a thick, cream-like liquid. I also tried a few drops of water, but got the same result. What must I do to make them dissolve? In preparing powdery pyroxyline, is it advisable to have the temperature of the acids heated so high as 170° or 180° Fahrenheit, and how long should the cotton remain in the mixed acids? What distance should a stop be placed in front of a 2½ view lens, with 14 inches focus? In copying photographs with a portrait combination, should the stop be in front or between the lenses? Knowing the practical value of the above queries, I have been rather lengthy in my communication; I hope you will deem this a sufficient apology.

PERSEVERANCE.

[Our correspondent has produced acetate of silver, by the union of the acetic acid in the bath with the oxide of silver used for neutralising it. The presence of this body in small quantities is rather an improvement with some collodions, but, in too great quantities, it is very prejudicial: the best plan to follow in such a case as the above is, to make the bath as cold as possible (near the freezing point), and then to filter it from the crystals; the low temperature will cause the greater part of the nitrate of silver to crystallise out.

The easiest plan to get a refractory substance to dissolve is, to triturate it together with the liquid used as a solvent in a mortar; the plan of adding a few drops of water previously to the salt, is likely to be injurious. The solubility of chloride of cadmium depends upon the strength of the alcohol used. If our correspondent will follow the above plan, using all the alcohol which we recommended, he will succeed in getting all, or nearly all dissolved. The slight residue, if any, may with safety be disregarded.

The temperature of the mixed acids in preparing powdery pyroxyline should not exceed 160° Fahrenheit; the cotton may remain in the acids for about half a minute.

We have found the best position for a stop in front of a view lens, provided that the lens be properly calculated and achromatised for photographic purposes, to be *as far off* as it is possible to put it *without* giving dark corners to the picture; possibly this position may not be theoretically the most correct, but it is a very good general rule to go by, and one easily remembered. It is a mistake to fancy that all portrait combinations require the stop to be placed exactly in the middle, between the two lenses. Portrait combinations by different makers require the stop to be placed at a different position, and this is frequently some point before the front lens. Putting it invariably *between* the lenses is a very Procrustean philosophy.]

ECONOMISING WATER IN OUT-DOOR PHOTOGRAPHY.

DEAR SIR,—I feel confidence in bringing the following formula under the notice of your numerous readers, as it has given me most perfect and certain results. I use a portable tent; it is quite large enough to work in, and will pack inside a 9 × 7 camera; in addition to which I take with me a 9 × 7 water-tight bath, holding 16 ounces of a 40-grain solution, 3 ounces of collodion, 5 ounces of developer, 12 ounces of syrup, and a light wooden bath to dip the plates in after development; also a plate box containing 7 plates 9×7. On arriving at the intended spot, the cover is thrown over the camera stand to form the tent, the camera then screwed on, and the view focussed. A small box which contains the chemicals, serves also as a seat for the operator inside. The plate is then coated with any good collodion, and, after exposure, developed with

Proto-sulphate of iron	20 grains.
Citric acid	½ "
Nitrate of potassa	15 "
Alcohol	30 drops.
Water	1 ounce.

When the details are fully brought out, the plate is drained on the ground for a few seconds, then dipped in the wooden bath; this is made the depth of the plate, so that no dipper is required; the bath is filled with syrup made thus:—

Brown sugar	1 ounce.
Water	2½ "
Beaufoy's acetic acid	1 drachm.
Honey	1½ "

This syrup will keep the plate moist till it is brought home, then it is washed and cleared, and redeveloped with pyro., and a small quantity of silver solution. The syrup has the double effect of keeping the film firm on the glass, and, under the influence of the pyrogallic, giving greater intensity. The time occupied in getting the negative will be only a few minutes, and the extra luggage to carry, a mere nothing.—Yours truly, THOMAS GULLIVER.

Swansea.

TO HOLD THE SENSITIVE CALOTYPE PAPER IN THE DARK SLIDE.

SIR,—I have read with great care your instructions in the "Calotype Process." I have laboured at many works in the hope of becoming expert at all the paper processes; but, to this moment, I am wholly at a loss to know how, when I have made any or all of these prepared papers, I can contrive to take a picture with them in the camera. None of the able narratives I have read consider so simple a matter worth mentioning. Suppose I cut the paper to the size of one of the glasses used for the slide, and insert this paper as I do the glass, the spring of the shutter will press it forwards. If I put a glass before or behind the paper, I fear it will be wrinkled; perhaps there should be a glass before, and one behind the paper to keep it smooth, but my slide will hold no more than one glass. Will you be so obliging as to say what is *the orthodox way* of doing that which, to every one else, must be very simple and very natural, although a puzzle to—Yours, &c. IGNORAMUS.

[The most usual way to place the sensitive paper in the dark slide of the camera is, to put it between two glasses; but, in our correspondent's case, this plan is inadmissible, both because the space is not sufficient, and also because the sensitive surface would not be in the correct focus. The paper must be in *front* of a piece of glass, similar to a film of collodion, and there are two ways of effecting this. The paper may be used *wet*, and, having been cut rather smaller, the back of it may be simply stuck to the glass by the adhesion of the two wet surfaces, either with or without the interposition of a piece of wet blotting paper; or, if the paper be used dry, it may be cut larger than the glass plate, and then, having placed the paper face downwards on a clean pad of blotting paper, lay the glass on it, and turn over the edges of the paper to the back of the glass, where fasten them with cement; in either case the glass holding the paper is to be inserted on the plate-holder as if it were a collodion plate; (a piece of warm wax will be found to answer very well.)

TO TRANSFER GLASS POSITIVES TO GLAZED LEATHER.

SIR,—Perhaps the following method of transferring positive pictures on glass to patent leather, &c., may be useful to some of your numerous readers. I have practised it myself for some time, and find it to answer exceedingly well. First, take some positive collodion, and thicken it with gun cotton until it will barely run over the plate, develop, and fix in the usual way, taking care that the picture is well washed; put into a dish or plate 1 ounce of common water, and 6 or 8 drops of oil of vitriol, put your picture into this, and work the dish backwards and forwards until you gently loosen the film; then take it out, lay your leather on to the collodion, carefully commencing at the bottom, and working the air bubbles out; then quickly raise one corner of the leather, and strip evenly off, and, if properly managed, the picture is perfect, and permanent. To prevent curling up when drying, I tie the leather round a large bottle. Hoping that you may have every success in your new field of labour, believe me, yours, &c., E. H.

BROWN PAPER BACKGROUND.

SIR,—I have perceived in the "PHOTOGRAPHIC NEWS" several communications on the subject of backgrounds.

I can recommend, both for cheapness and excellence, common brown paper, strained on a wooden frame. It may be obtained in continuous lengths, five or six feet in width. By arranging the frame on which it is strained behind the sitter, either vertically, or at an acute or obtuse angle with the ground, any tint may be produced, according to the degree of light falling on the surface. It is well to damp the paper before straining it on the frame, in order that, by its subsequent contraction, it may present an even surface; otherwise, in damp weather it will be inclined to give, and form puckers. W. F. W.

STOPPING OUT THE SKIES OF PAPER NEGATIVES.

SIR,—Your correspondent, W. M., asks, whether he can obtain a dark vehicle for stopping out the skies, &c., on waxed paper negatives. I find the moist lamp-black (water colour) sold in tubes to answer well for this purpose. It is improved by having a little Indian yellow mixed with it, and should not be too much diluted, as it works better when moderately thick. If the negative is slightly damped, by placing it, for a short time, in a sheet of wetted blotting paper, it will take the colour readily. The Indian yellow *alone* may also be used to improve any portions of the negative that print too darkly for the general effect.

Croydon. ALIQUIS.

ANSWERS TO MINOR QUERIES.

PRECIPITATE ON DILUTING A SILVER BATH.—*W. B. N. C.* has added distilled water to his nitrate of silver bath, and finds it throws down a precipitate; this, he concludes, arises from the distilled water not having been pure, but containing chlorides. On adding crystals of nitrate of silver to the turbid bath, he is surprised to find that the precipitate dissolves, and the bath becomes clear. Queries:—Can the precipitate have been chloride of silver, as this substance is stated to be *insoluble*, and will the bath be injured? Our correspondent has fallen into an error which not only photographers, but experienced chemists, sometimes make. It is not generally known that chloride, bromide, or iodide of silver, although insoluble in water, is capable of dissolving to a considerable extent in water containing nitrate of silver, the quantity dissolved increasing with the amount of nitrate present. Supposing a solution of nitrate of silver of a certain strength be taken, and this saturated with any or all of the above mentioned silver salts, the addition of water will, *by weakening the solvent power* of the nitrate of silver, cause a precipitation of the dissolved chloride, bromide, or iodide. Frequently chemists accuse distilled water of containing chlorides, because a precipitate is formed on testing it with nitrate of silver solution, when the fault lies in the latter. In our correspondent's case the addition of water to the bath has caused the precipitation of the iodide of silver with which it had become saturated. When, however, the fresh crystals of nitrate of silver were added, the bath became again of its original strength, regained its solvent power on the iodide of silver, and the precipitate re-dissolved.

FOCAL LENGTH OF COMPOUND EYEGLASSES, AND MAGNIFYING POWER OF TELESCOPES.—*T. C.* wishes to know how to find out the magnifying power of a compound eyeglass, and also a telescope, the focal lengths of the constituent lenses being known. To find the focal length of a compound lens of the Huygenian or *negative* construction, divide twice the product of the focal lengths of the lenses which compose it by their sum: thus, if the focal lengths of the field and eye-glasses are 3 and 1, that of the equivalent lens is equal to $\frac{2 \times 3 \times 1}{4} = 1\frac{1}{2}$. To find the focal length of a Ramsden's or *positive* eye-piece, divide the product of the focal lengths of the lenses composing it by their sum, less the distance between the lenses: thus, if the focal length of each lens be 1·5 inch, and the distance between them 1 inch, it will be $\frac{1 \cdot 5 \times 1 \cdot 5}{3 - 1} = \frac{2 \cdot 25}{2} = 1 \cdot 125 = 1\frac{1}{8}$ nearly. The magnifying power of a telescope is found by dividing the focal length of the object-glass by that of the eye-glass.

ACETO-NITRATE OF SILVER FOR PRINTING PURPOSES.—*Barium* has a quantity of aceto-nitrate of silver which has been used for the albumen process, and now, having no further use for it in that way, asks whether it can be used for printing. If carbonate of soda be added until a slight precipitate is formed, which will not dissolve on agitation, and then, after filtering, a few drops of acetic acid be used, it will do for exciting positive paper, provided the solution have the proper number of grains of nitrate per ounce of water: if it be below 60 or 80 grains, add more. *Barium* also asks if a collodion plate which has been developed in a dark tent can be brought with safety into the open air to be fixed. If the developing solution be washed off with water, this may be done without danger; but if any developing solution remain on the surface, there will be danger of a deposit over the surface. [For the other query, see *Accelerating Agents* in our dictionary.]

ENLARGED POSITIVES.—*G. S.* inquires if enlarged positives can be printed from small negatives by means of a quarter plate double combination, either by a copying camera, or by placing the ordinary camera against a hole in the shutter of a darkened room and receiving the magnified image on a screen or stand to hold the paper. Also what preparation of paper would be most suitable. The plan mentioned above will answer if properly carried out. The portrait lens should be *reversed*, and the *cap* end placed next to the sensitive paper at several feet off, and the other end opposite the small negative at a distance a little greater than the focal length of the lens. A strong light (sunlight by preference) should shine through the negative, and no other light must find its way into the room. The focussing may be easily managed by varying the distance of the lens from the negative. The calotype process, as given by Θ in recent

numbers of the "News," will be best adapted to the purpose of copying in this way.

Pictures on White China.—*J. W.* The pictures are collodion transmitted *positives*, which have been either taken in a copying camera from a negative, or else printed from a negative by superposition. Blackening afterwards, by perchloride of mercury and then ammonia, improves them.

Particulars for Building a Glass Room.—*Chemicus* is going to build a glass room, &c., and wishes for information on the subject. So much depends upon the space of ground that may be covered, the scale of operations intended to be carried on, and the length of the operator's purse, that we can only give very general hints on the above subject. In our "Catechism" will shortly appear as much instruction on this subject as will be generally useful to our readers.

TO CORRESPONDENTS.

*** *An important letter from Sir J. F. W. Herschel, "On the Photographic Properties of a New Metallic Element—Junonium," will appear in our next week's number.*

Z.—*Plain* paper is used for floating on the albumen and salt.

R. D.—The photograph you have sent is a very good specimen of the process. We do not think your charges too high.

An Aquatint Engraver.—Your first queries have already been fully answered. Tone first, then fix.

H. D.—The piece of paper inclosed is iodised *waxed paper*, and is totally unfit, therefore, for the calotype process.

Nit. Sil.—We much regret that you should have been so deceived, but we cannot say more. It is not possible that we can be always answerable for advertisers keeping faith with the words of their advertisements. We are much obliged for the formula, and have made use of it in another part of the "News." Your other queries have been recently answered.

H. C.—We regret we cannot furnish you with the particulars.

J. C. L.—We thank you for the formula, but do not see how it would apply to *acid* stains.

A Young Amateur, Glamorganshire.—If you favour us with an addressed envelope, we will forward the desired information.

L. L. B. Cantab.—Portrait combinations stopped down will give equally good relief in a twin stereoscopic camera as a pair of single lenses. The former letter alluded to not received. Thanks for the extract.

T. Clark.—We are obliged for your information. In our next number, however, will be given a long article on the subject of Fothergill's process.

R. W. F.—1. Some apparatus is made for 5¼ × 3¼ stereoscopic plates; we are not in favour, however, of a departure from the usual 6¾ × 3¼ size. 2. Ground glass. 3. Already answered. 4. No definite distance; we prefer only a few inches.

J. Ascough.—Powder the amber finely; and the chloroform will, in a few days, dissolve as much as will be necessary.

W. M.—1 and 2. The plan you mention, if properly followed out, will wash your pictures enough. 3. No good process.

Chemicus.—1. Already answered. 2. Very unsatisfactory. 3. The plan has been suggested, tried, patented, and given up a year or two ago. It will not answer well in practice.

A. B., Dumfermline.—They are very bad, if they will do no better than you state.

G. B.—It will not keep many days, even in the dark, if it contains silver.

Young Amateur.—See a note on stopping out the skies of paper negatives in the present number.

J. A. L.—Some hypo. has accidentally got on to the paper before exposure. We reciprocate your kind wish.

C. J. P.—We fear we cannot do as you wish.

C. P. and H. C. had better advertise in our columns.

A Subscriber.—The stop is for the purpose of confining the action of the *centre* of the lens to the *centre* of the picture, and the *edge* of the lens to the *outer parts* of the picture; consequently, if the diameter of the lens be not in proper relation to the focal length, the outer parts of the picture will suffer.

J. W., Edinburgh.—We are much obliged for your kind information. We cannot believe what report says, but "seeing is believing;" we have written for information to the artist himself, and shall be pleased to see some specimens.

O. X.—1. Add 2 drachms of old collodion; shake well, and filter. 2. Carbonate of soda.

S. T. B.—We have already heard of it; and hope to give particulars in our next.

C. L.—No; excepting for astronomical purposes.

Toujours Propice.—1. Yes; if the lens be good, and have a small stop. 2. Yes; we may, however, give our own; but cannot say that it will be best for beginners. 3. Already answered.

T. F.—The process referred to is identical with M. Haudoy's, to appear in our next.

Daguerreotype.—Try the formula at page 33. We should like the details of your process.

Harry.—1. The *film* of collodion ought always to be transparent; but you cannot make the *deposit* so by varnishing. 2. Add chloride of gold.

Lignum.—Our "Catechism" will be your best guide. Your optical difficulties will be perhaps solved in the articles which will appear from time to time in our pages, signed V.

H. T. T.—Has your collodion properly settled?

E. M.—It would be impossible to give, in the space at our disposal, the requisite information to enable amateurs to grind and construct their own achromatic lenses.

Perseverance.—There is no really practical process known for taking direct positives on paper in the camera.

A. Y. Z.—The daguerrotype process is so little used now, that we doubt if a series of articles on it would be of any interest to the bulk of our readers.

A. G. G.—1. For negatives. 2. The usual one. 3. Yes, if a small stop be placed in front. 4. Already answered.

B. R. M.—The principal requisites for instantaneous pictures are good light, good lens, and ordinarily good chemicals. We had the two first in perfection, and with glycyrrhizine in the bath and nearly colourless collodion, no conjuring was required to take a picture of rapidly-moving objects.

Pyrogal. Acid.—1. An excellent paper on printing, from the pen of our talented correspondent Θ, will appear in an early number — till then try the formula given at p. 33. A small rolling mill can be purchased for about £5.

Captain R.A.—1. To un-iodised collodion. 2. No plan is known sufficiently *simple* and *certain* for beginners to use with advantage.

W. Daking.—We will give your letter serious consideration, but cannot say whether we can yet open our columns to such a subject.

J. Crabtree.—Use marine glue as a cement, and varnish with spirit varnish.

Inquirer.—They are all for the negative process. A good lens is, however, the best accelerator.

J. B.—Hypo.—Q. R.—Q. E. D.—Thomas.—A Subscriber.—Another Subscriber.—E. F.—Silver.—S. P.—Lux, F.—Our correspondents will see that it is out of our power to save them the trouble which is indispensable in mastering the principles of any science.

Communications declined with thanks:—J. B.—Potass. Cyanide.—J. J. Opie.—F. W.—A. F. P.—Pyro.—T. G. C.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—D. E.—C. B.—Photo.—S. A.—A Seeker of Knowledge.—J. T.—Amateur and Subscriber.—H. M.—A regular Subscriber.—In a Fix.—L. L. K.—X. Y. Z.—Uncle Tom.—Achromatic.—Positive.

In Type.—R. G. S.—J. L. S.—Θ.—A. Keene.—Earnest.—F. W. B.—Sir J. F. W. H.—A. Molson.—M. Haudoy.—T. Reid.—J. Heywood.—C. B.—J. B.—An F.C.S.—R. W. H.—S. M.—W. D.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., NO. 8.—*October* 29, 1858.

ON OBTAINING STEREOSCOPIC PICTURES FROM FLAT SURFACES.

THE *Times* recently surprised its readers by the announcement that Mr. Sang, of Kirkaldy, had succeeded in obtaining stereoscopic pictures from flat surfaces, a thing which, it says, had been hitherto considered impossible. If this were so, we conceive that the impossibility was assumed, for we are not aware that any attempt to accomplish this result had been made until Mr. Sang brought his ingenuity into play for the purpose. The subject of the stereograms, with which that gentleman has favoured us, is the well-known series of etchings, "The Bottle; or, the Drunkard's Progress," by Mr. George Cruikshank, to whom these reproductions are dedicated. The subject is sufficiently lugubrious, and not particularly well adapted for the stereoscope, inasmuch as the class of persons who purchase these pictures are not, as a rule, addicted to what are termed, no doubt ironically, the pleasures of the bottle, and are, therefore, not in need of the lessons conveyed in these etchings. This, however, is a mere matter of taste, the point of consideration now before us being Mr. Sang's discovery of adapting flat pictures to the stereoscope; and this, we must admit, he has to a certain extent succeeded in accomplishing: we say "to a certain extent" advisedly, for though the figures themselves are seen in relief in the stereoscope, they individually lack that rotundity which is observable in stereograms of objects taken in the ordinary way.

This appearance of flatness appears to us to be inevitable from the nature of the subject. The rumours of the accomplishment of this desideratum at once set us to work, and the specimens which were forwarded to us had not long been in our possession before we succeeded in imitating their effect with perfect accuracy. Of course it is not in our power to state that we are in possession of the exact plan which Mr. Sang employs for obtaining the stereoscopic effect, but we lay the following method before our readers as being one which has enabled us to produce similar effects of factitious stereoscopic relief.

Let our readers take a stereoscopic slide in which there are objects in different planes, and which have, consequently, different degrees of relief. It will be seen, after a little scrutiny, that objects in the foreground occupy in each picture slightly different positions with respect to distant objects; being in the two pictures displaced laterally towards each other. On examining one of the "Bottle" series in the same way, it will easily be seen that this same difference of position of the figures is observable in the two halves of the slide; the right-hand picture showing more background on the right side of the figures, and the left-hand picture more on the left side of the figures. Now it is very evident that, from whatever point of view we look at an etching or engraving, we cannot see a bit more behind any of the prominent figures than the artist has permitted us to see; consequently, as these stereograms *are* from etchings, and we *can* see more of the background in one than in the other, some alteration or tampering with the original print has taken place. If the left picture be a true copy of the etching, no camera could see it as shown at the right of the slide, where the prominent figures are laterally displaced; they could not move sideways of their own accord, and, therefore, somebody has assisted them. But if an etching be taken, and one of the prominent figures be cut out of it, and then placed a little to the left of its original position, it will conceal part of the background on one side of it, but, at the same time, leave a very ugly hole in the paper on the other side; this may be filled up with white paper, and, by careful management, the missing background drawn with a fine pen, dipped in Indian ink.

Let us now test the truth of the above supposition, by a scrutiny of the remarkable slides before us. One half of each slide has, according to the above, been photographed direct from the original etching, and the other half from another etching, in which the figures intended to be in relief have been cut out, moved sideways to a greater or less extent, according to the degree of relief required, and the space which has thereby been left vacant, filled up by hand with a continuation of the background. Which of the two halves is copied from the original picture, the right or left? On examining the slides carefully with a microscope, the edges of all objects in the right half appear perfectly sharp and crisp, whilst those in the left-hand picture show evident signs of woolliness, more so, however, on the outer than the inner side of the figures. So far, so good; the right half of each slide is "the bottle" unsophisticated, whilst the figures in the left half have been cut out, and moved sideways. If so, further scrutiny should show the space formerly occupied by the displaced figure, and now occupied by the pen and ink background. This alteration is evident in all the slides, but more so in some than in others; in No. 1, the position formerly occupied by the left-hand corner of the table cloth in the left picture is clearly to be traced. In that affecting slide where the youngest child is lying in its coffin, the same thing is observable in the outline of the mourning sister and the head of the coffin. A curious effect is perceptible in No. 3, on its being placed in the stereoscope; the figure of the little girl, which, to the naked eye, appears to be standing behind her mother's chair, with her hand resting on the back of it, is thrown so far in the background, that the connection between her body and her hand is entirely cut off. In No. 6, where the drunken wretch is striking his poor wife, the faint outlines, both of himself and that of the overturned table, are clearly to be traced about a thirtieth of an inch to the left of the figures in the left half of the slide. In No. 7, in which the ingenuity and patience of the artist must have been taxed to the utmost, and in the terribly true closing scene, the same phantom outlines may be traced running down the left sides of the figures; indeed, in the specimens before us, the traces of *doctoring*, in No. 8, are so evident, that we can scarcely imagine any one not seeing at a glance how it has been tampered with.

We have not only arrived by induction at the probable method by which this remarkable series was produced, but we have, by putting our theory to the test of practice, proved conclusively that such a *pseudo*-stereoscopic effect can easily be produced by the above means. Many things of minor detail of course must be attended to in order to obtain the best results: for instance the figure must not be moved in a parallel direction, but must form an angle with its first position, the feet remaining on the same spot of the floor as at first, and the rest of the figure being moved through a very small angle round these as a centre, otherwise the figures would not appear to stand upright on the ground; the floor likewise must undergo a rather difficult process of doctoring, in order to make the lines of board in the left-hand picture form that angle with those lines in the right-hand picture, which is necessary to the illusion of its being flat. These and other little matters can be easily found out by trial,

provided the experimentalist has a true knowledge of the principles which give rise to the illusion of relief in the stereoscope.

Having thus shown how this curious effect *can* be produced (indeed, if our induction be logical, how Mr. Sang *has* produced it), we must give full credit to that gentleman for the great ingenuity he has shown in thus bringing (however imperfectly) the world of the painter and engraver into the domain of the stereoscope.

SIR J. F. W. HERSCHEL ON THE PHOTOGRAPHIC PROPERTIES OF JUNONIUM—A NEW METALLIC ELEMENT.

It is no uncommon thing for those who have no knowledge of photography, beyond a general acquaintance with the manipulatory part of the art, to speak of it as a mere mechanical process. It is not our intention in this place to enter into a defence of the science; but we would call the attention of those writers to the important scientific results to which it has just led, when directed by the powerful intellect of the writer of the subjoined letter. Our readers must have been struck with the importance of the discovery hinted at in the concluding paragraph of Sir John Herschel's address to the chemical section of the British Association, which we reported at vol. i. p. 49, in which the learned speaker mentions the great value of photography as a chemical test, in affording evidence of the "presence, in certain solutions, of a peculiar metal—having many of the characters of arsenic, but differing from it in others, and strikingly contrasted with it in its powerful photographic properties, which are of singular intensity—surpassing iodine, and almost equalling bromine."

The grandeur of such a discovery impressed us no less as photographers than as chemists; and we immediately wrote to Sir John Herschel on the subject, and promptly received an answer, from which we have great pleasure in laying the subjoined extracts before our readers.

"*Collingwood, October* 13*th*, 1858.

"Sir

. . . .

"I inclose specimens of paper prepared with a solution containing "junonium" (the presumed nondescript metallic body to which allusion is made in the address you have quoted) and nitrate of silver, as also specimens similarly prepared with hydriodate and hydrobromate of potash, binarseniate of potash, arsenite of soda, and with nitrate of silver alone, and which have been all exposed simultaneously, over half their extent 60″ to the general diffused light of a very dark cloudy day. You will perceive the great difference of the action between the paper prepared with junoniate of soda and those prepared with arsenic.

"I have nowhere yet described the metal which, when satisfactorily insulated, I propose to call junonium (and which is only one of a group of metals under investigation, to which, provisionally, I have attached the names of junonium, vestium, neptunium, astæum, and hebcium—supposing the characters, by which they appear to me to differ from others already known, to be satisfactorily made out); and I am therefore unable to comply with your request that I will refer you to some published account of it.

"May I be allowed to add, that the process described by M. Bischoff (read to the Soc. Vaudoise des Sciences Naturelles, and printed in the bulletin of that society, No. 42, tom. v.), for procuring impressions in Prussian blue, differs in no respect from the cyanotype processes described in Arts. 210, 223, of my paper on photography, in *Phil. Trans. R. S.*, 1842, except in the substitution of the peroxalate of iron for the ammonio-citrate—a change, as it appears, for the worse. I annex a negative, obtained by a careful following out of Signor Venanzio G. Sella's process, described in the "Memoirs of the Acad. Sci. of Turin," tom. xvii., new series, p. cliii.: it is not very satisfactory, force being wanting; but the object of the process (to dispense with silver and avoid fading out) is so important that I would recommend it for further trial and improvement.

"I am, sir, your obedient servant,

"J. F. W. Herschel."

With respect to the specimens of paper, we may observe that so great is the sensitiveness of the junoniate of soda that, while the paper prepared with the nitrate of silver alone offers scarcely a trace of the luminous action, that prepared with the former substance is of a deep, rich chocolate colour, far exceeding in intensity that prepared with iodide of potassium, and quite equalling the bromide of potassium paper. We have been favoured by Sir J. Herschel with a small quantity of junoniate of soda, and we are at present occupied in an examination of the action of the various colours of the solar spectrum upon junoniate of silver; its remarkable sensitiveness to light renders this an inquiry of much importance and interest. We shall have great pleasure in communicating the results of our experiment to our readers in a future number.

POSITIVE PRINTING.

Of all the branches of photography, none seems to be made the subject of less study by the beginner than this; yet, if the operator wishes to get good or first-rate pictures, there is no branch of the art to which he must pay more attention. Except a man knows it, the expense of photography is enormously increased; and this, to many, is a serious consideration. My object in this paper is to give a printing process of which the results are equal to any known method. It is economical in the silver, very quickly toned, and free from every disagreeable colour in the lights.

The process:—Float the paper upon the albumen solution, prepared with 12 grains of chloride of ammonium to each ounce; dry as usual, and excite on a silver bath 60 grains to the ounce with 4 or 5 drops of acetic acid; dry thoroughly, print deeply, and wash to free from the nitrate of silver. When ready for toning, immerse the print in 10 or 12 drops of ammonia to 6 or 8 ounces of water; let it remain in the liquid for four or five minutes, take out and wash one minute in water, then immerse in the gold bath prepared with chloride of gold 1 grain, carbonate of soda 20 or 30 grains, water 6 or 7 ounces; keep the paper moving about, and when it looks very purple (generally from three to six minutes) take out, just wash in water, and place immediately in the hyposulphite solution, which should be 1 ounce to 6 of water. Then wash as in other processes to free the print from hyposulphite.

As to the materials, every man has his own likings. I prefer Canson's paper, though it is a little longer in toning than the German papers. Marion's I never can get free from black marks—not the metallic spots, but minute dark grains all over the sheets—and I also find they will not keep. The German papers are very good, but they will not take so good a surface as Canson's, in my hands. Of the English papers I have worked but few, and those were not so satisfactory as the foreign.

When excited—if they are not dried by the fire, but left to hang in a dark room, or, better, a cellar—the papers will keep a few days, even a week, well enough; but if artificially dried, discolorisation begins immediately, even in total darkness, and in a day or two the paper is scarcely fit to use. The acetic acid, I think, serves to make the paper keep its whiteness longer than it otherwise would.

The best method of keeping the chloride of gold is to procure it in the fifteen-grain tubes, and immediately dissolve this in 15 drachms, of water; then a drachm gives 1 grain of gold, which is sufficient for four pictures 10 × 8.

Some of the advantages of using this printing process are the following:—The strength of the exciting bath need not exceed 60 grains to the ounce. It is also very sensitive and tones well. Again, the great drawback to using albumenized

paper is the yellowness which the gold toning often gives to the whites. How often do the "*Notices to Correspondents*" in the different journals advise the beginner not to use anything but plain paper on account of this difficulty! How many pictures in our best exhibitions have this defect! Some lay the blame upon the hyposulphite of soda bath being not freshly made, and a thousand other causes; but the method I have described above effectually does away with it. There is not any tendency to yellowness in the toning process—nay, however yellow and discoloured the whites are when the picture goes into the toning bath, they are effectually and perfectly whitened in it during the action of the gold. If used as above, it is utterly impossible to avoid bleaching the whites, and the resulting prints are as good and brilliant as those produced by any known process.

Then, again, time is an object to many, and here this method is again of advantage. Instead of from 30 to 60 minutes which thickly albumenised paper takes to tone in the old sel d'or bath, from 3 to 5 only are required: and lastly, as to its permanency, one of our best chemists says "that it is more *chemically correct* to tone photographs with an alkaline solution of chloride of gold, but the acid gives the best results." This I answer by a total dissent from the latter statement. The alkaline gives, *at least*, equal results; and, instead of having many refuse prints on account of yellowness, there need not be a failure, except by accidents, which are not the results of any particular process.

We have to thank our correspondent for some very beautiful specimens of the process he has so well described. They are perfectly pure and free from yellowness in the white parts, with very vigorous blacks.—Ed.

FOTHERGILL'S PROCESS.

BY MR. A. KEENE.

In reply to a paragraph in a recent impression asking for information on the "Fothergill Dry Process," I have much pleasure in sending the following, feeling convinced, both from my own experience and a very extensive correspondence with photographers in all parts of the country on the subject, that it is as yet unrivalled. The "dry process" has been pronounced, by the most competent judges—and some of whom were previously prejudiced against all dry processes—unsurpassed even by the wet, more particularly for half-tone, vigour of delineation, and the general softness of appearance.

The following essentials should always be attended to:—Perfectly clean plates; suitable collodion—neither too contractile nor too powdery; neutral bath; proper amount of washing, and, I may add, perfect drying. I always prefer soaking the plates, whether new or old, first in a rather strong solution of common washing soda, and afterwards in nitric acid diluted with about equal parts of water, putting a piece of straw, or something of the kind, between each, to prevent them coming too closely in contact. The bath should be fully 35 grains to the ounce, and made with pure nitrate of silver slightly and carefully fused, to remove all trace of free nitric acid; saturated with iodide in the usual way, and if found slightly alkaline, a drop or two of glacial acetic acid may be added to every 10 ounces. Remove all dust from the plate; coat with collodion; and when the film has *well set*, put it in the bath; after about half a minute move it up and down occasionally until the greasiness disappears—in warm weather this will be in a minute or less, and longer according as temperature is lower; remove it from the bath; and if the extreme upper end shows a slight transparency compared with other parts, the film has been sufficiently well set. Place it on a levelling stand, smaller in diameter than the width of the plate, and pour lightly on, at one corner or along the end, for a stereoscopic sized plate 4 drachms, and for 10 × 8 do. 15 drachms of filtered rain or distilled water; cause it to flow all over, from *end to end* and *side to side*—by inclining the plate by *means of the stand*—well up to the edges, *that the bath may be equally diluted on every part of it*. By bringing the eye to a level with plate, the operator is enabled to see whether the water at *once* flows over *every* part; if not, sufficient impetus must be given to the wave in that direction to cause it to do so; continue until all greasiness disappears—this requires from fifteen to thirty seconds for stereoscopic plates, according to the temperature, and about double that time for 10 × 8 size; empty off the water, and pour on sufficient albumen to coat it; this is to be prepared as follows:—white of egg 10 ounces, distilled water 8 to 10 ounces, *strong* liquor of ammonia 80 to 100 minims; agitate into a froth, and strain for use; this will keep, well corked, for a week or two; the portion required should be filtered through sponge always just prior to use. To insure its being well up to the edge, cause it to follow the finger all round the plate, taking care that the finger is perfectly clean, and rests against the under part so as not to disturb the film on the surface. After running the albumen round several times, say for about half a minute, empty it away, and place the plate in a dish containing sufficient filtered rain water to cover it to the depth of about a quarter of an inch; make the latter pass freely backwards and forwards over it for about half a minute; repeat with a second quantity; take out the plate, and pour lightly on at one corner, or along the end, sufficient water to pass all over it. Place it on one corner, on several thicknesses of blotting paper, in a chemically dark place, free from dust, to dry; after it has thus stood for about an hour, a further drying by artificial means has been found of essential service, particularly when the atmosphere is damp; for this purpose, the plates may either be placed on an ordinary water plate, filled with nearly boiling water, for a few minutes, as recommended by Mr. Prichard, or placed on a shelf in a cupboard, and a water bottle filled with boiling water placed in front of or immediately underneath them, as practised by Mr. Ebbage with great success, or by any other convenient means, care being taken that the temperature does not exceed about 140° Fahrenheit. This has been termed "film dryness," in a very excellent paper on the Fothergill process, read by a Mr. Aywood. In it he states, that not only is sensitiveness increased by this artificial drying, but that the unevenness of sensitiveness, occasionally experienced from the plate being only surface—instead of film—dry in some parts, is obviated by it. This has also been previously observed by Mr. Prichard and Mr. Ebbage. When the plates are finished, they may be placed in the dark slides or a *tin* box, but on no account in a deal one. The exposure varies so considerably, according to circumstances, that only a very general idea can be given. One of our most successful operators has been giving, for stereoscopic pictures with a single 4½ inch focus lens with a small stop, forty and fifty seconds' exposure on general average subjects. Before developing, moisten the surface of the film with distilled water; develop with

Pyrogallic acid	...	...	...	...	1 grain.
Glacial acetic bath	...	...	...	...	20 minims.
Distilled water	...	...	...	...	1 ounce.

To each drachm of this add one drop of a 33 or 35 solution of silver; continue the developing until the picture is well out, changing the solution as often as it becomes discoloured; the time required is generally from three or four to ten minutes with a high temperature, but with a low one double that time, or even more, is sometimes required.

Here, I would draw attention to an error many commit when practising this process, viz., *over*-developing, by which many excellent negatives are lost, half-tones and sharpness of detail being entirely destroyed by it, and those very objectionable contrasts obtained. If the exposure, &c., has been correct, the sky and high lights will begin to show themselves in about a minute or so after the developing solution is put on, the shadows gradually making their appearance; as soon as the former are dark and opaque, but not entirely black, and the latter well-defined, the developing may be considered complete.

Fix with hyposulphite of soda 43 to water 12 or 16. If a stronger solution than this is used, or cyanide of potassium, the negative will be injured, and film liable to curl off when dry.

I have here endeavoured, as fully as possible, to give the details of the process, and will now explain the why and wherefore of the more important parts of the operation, and commence with washing the sensitised plate. As a concentrated solution of nitrate of silver coagulates albumen, the object is to *evenly* dilute the bath on the surface of the plate to a point that does not produce this effect, at the same time going as little beyond as possible. This desideratum is arrived at by using the prescribed quantity of water in the manner directed, and will explain the necessity for the uniform dilution; for on whatever part this does not take place, the albumen is partly coagulated, and various lines and marbly stains appear on developing; if, on the other hand, more water is used, the silver left will be too little to form with the albumen a sufficiently sensitive film. It is rather a disputed point, whether albumen merely acts mechanically as a coating, or enters into combination with the nitrate of silver. My time has latterly been too fully occupied to enable me to ascertain this by direct experiments, but there are many things that cause me to consider the latter to be the case; and, taking this for granted, the process, as well as the great sensitiveness of plates prepared by it, are easily explained in the following manner:—During the formation of the iodide of silver, when the plate is in the nitrate bath, the pores of the collodion are filled with the bath; when the water is poured on for diluting that on the surface, as it is specifically lighter than the solution, it does not, in the short time it is allowed to remain on unite with or dilute the portion in the pores; but when albumen is poured on, of a density near or equal to the silver solution, and the latter also having an affinity for it, union takes place, and the whole pores are filled with a coagulated sensitive compound, which is not disturbed by the gentle washing used for removing the albumen in excess. The dark marks experienced when developing a plate that has had albumen poured on before being properly washed, after sensitising, also confirm this view of it; the coagulated sensitive compound, remaining in a thin stratum firmly on the surface, is not removed with the gentle after-washing, and so shows itself during development. It is necessary that the water used for washing should not, during any part of the process, be allowed to fall with force on any part of the plate, or a *non-sensitive* patch or patches will appear on development. It is also necessary that the hands should be perfectly free from silver solution when handling plates with albumen on them, and *vice versâ;* a good plan is to have a basin of water, and dip the fingers in, and wipe them after each part of the operation, taking the precaution to use one hand for handling the plate when the silver solution is on, and the other when albumen is on.

It must not be thought, because I have entered so fully into particulars, that the process is tedious, or difficult in manipulation. I could, if necessary, show it to be the most easy and simple of all the preservative processes, and a 10 × 8 plate has, to my knowledge, been perfectly prepared *in three minutes* from the time of taking it in hand, to placing it on end to dry.

Leamington, October 19*th*, 1858.

URANIUM PRINTING PROCESS.

BY M. HAUDOY.

In No. 3 of this paper a reference was made to the process of obtaining uranium proofs employed by M. Haudoy. He says:—"I prepare my paper with the gelatine and nitrate of uranium, in accordance with the instructions given by M. de la Blanchere. After exposure, I use the aceto-nitrate of silver bath used for negative proofs upon paper, for developing. The exposure to the sun varies, according to the nature of the slide, from one to ten minutes, but should be so long, that thirty to forty seconds in the bath above mentioned should make the proof complete. I then take it out, and lay it in the following bath:—

Water	100 parts.
Proto-sulphate of iron	8
Acetic acid...	2

The picture acquires great vigour in this bath, and appears, so to speak, to come out from the substance of the paper to appear on the surface. In fact, the nitrate of uranium proofs that have not undergone this reaction, are only good as transparent views—the very opposite being the case with the pictures that have been submitted to the action of the iron bath. If the exposure to the sunshine has been too prolonged, it will be necessary to wash the proof slightly on removing it from the silver bath before submitting it to the iron bath. On coming from the iron bath, the proofs have a sepia tint, more or less intense; they are darkened by means of the chloride of gold (perchloride of gold, 1, distilled water, 1000); washings must be repeated in several waters. The proofs presented to the French Society have no other object than to show the results of this process, which, better than any other, gives a faithful representation of the negative. The action of the iron bath being rather rapid, it is necessary to have a dish full of water beside it, in which to plunge the print when it has acquired sufficient vigour. This point should be a little exceeded when it is intended to submit it to the action of the chloride of gold."

Critical Notices.

A Guide to painting Photographic Portraits, &c. By A. N. Rintoul. Third Edition. London: J. Barnard, 339, Oxford-street.

The subject of tinting or colouring photographs is one which will doubtless interest the great majority of our readers, as most photographers have, at one time or other, been delighted by some choice specimen of colouring, or disgusted by an unnatural daub, in which the only thing which the painter accomplished was, to lose the resemblance.

In tinting photographs, too much caution cannot be observed in preserving the fidelity of the likeness, the one thing to which all else should be subservient; and it cannot but be a matter of regret that very *pretty* pictures, but with the fatal fault of being unlike, are everywhere to be seen, and are too often admired. As far as light and shade are concerned, the painter cannot hope to improve upon the photograph; he has only to supply that in which our art is deficient—colour, and the stone-like picture becomes life-like. These remarks are occasioned by the issue of a new edition of the above little work, containing a complete description of the different processes, viz., water colour, powder colour, oil colour, &c. The work contains directions for the preparation of the paper; for making the different tints required; for the use of the photographic water colours; a few hints on dry tinting; and brief instructions on oil painting. It is written clearly, and contains explicit directions as to the mode of procedure, from the taking of the photograph to the finishing stroke of the pencil. A series of diagrams accompany the work, showing many of the different tints required, and the shadow colours passing over them, illustrating the effect of glazing; also, the compounded flesh colours.

We must refer our readers to our advertising columns for particulars of the photographic water colours, which have been prepared as an accompaniment to this little work. The box consists of twenty-one of the most useful tints. In the case of the artist who has but little time to devote exclusively to colouring, they cannot fail to be of the highest value, as he will find ready to his hand the appropriate tints for his work, which will obviate the loss of time occasioned by

the mixture of several colours, the combination of which, also, requires experience and knowledge; and the professional colorist, though he may not find, perhaps, all the tints he requires, will find many with which he cannot easily dispense.

Photographic Chemistry.

NATURE OF THE METALS.

(Continued.)

Mercury is a metal which, unlike others, requires no heat to fuse it: indeed, except under artificial circumstances, we only see it in a liquid form. It can, however, be solidified by reducing it to a very low temperature—a circumstance which occurs spontaneously in Siberia in the winter, as well as in one or two other parts of the world. As a solid it may be cut with a knife, and is very slightly malleable. The temperature at which it freezes is 40° below zero, and at 660° above it it boils and evaporates. Its volatility, however, is such that on exposure to the atmosphere at ordinary temperatures it gives off vapours; as may be easily demonstrated by placing a piece of gold over mercury, in which situation it will speedily whiten, from the combination of the vapours of the mercury with the gold, for which metal it has a great affinity: so great indeed that, when combined, they can only be separated by submitting the metals to a high temperature, when the mercury is volatilised. It combines with oxygen in two portions, forming protoxide and peroxide of mercury, the latter of which, composed of 8 parts of oxygen to 100 of the metal, may be obtained by boiling it for a considerable time in contact with air or oxygen. It combines with chlorine in two proportions, the lesser combination producing the chlorine commonly known as calomel, which is formed of 18 parts of chlorine to 100 of the metal; and the other, composed of 36 parts of chlorine to 100 of the metal, producing the bichloride of mercury—generally denominated corrosive sublimate—which is used in photographic operations for whitening direct positives on glass. The principal use of mercury in photography is to develop daguerrean plates; which is accomplished by heating the mercury to a temperature of about 140°, when it gives off vapours which settle upon the plate, and the picture gradually becomes visible.

Platinum is a metal which possesses many qualities that would render it extremely useful in photographic manipulations, but its scarcity, and consequent high price, make its employment inadmissible in the way in which it would be of the most use, viz., in the formation of utensils which would be alike unaffected by heat or cold, or by almost any chemical agents, *aqua regia* excepted. Platinum, dissolved in this liquid and the solution evaporated to dryness over a gentle fire, yields a reddish brown salt in crystals; this is the bichloride of platinum—which, as it attracts moisture from the air, should be kept in a well-stoppered bottle. The bichloride of platinum is sometimes used as a substitute for the chloride of gold in toning pictures. M. de Caranza was one of the first who employed this substance for the purpose, and his method will be found described at length in the Bulletin of the French Photographic Society of 1856. There is a form of this metal which is termed spongy platinum, which, on account of its singular properties, we will describe here, although it does not bear directly on photography. It is prepared in the following manner:—A piece of platinum is dissolved in a mixture of nitric and hydrochloric acids with the assistance of heat, and to this solution is added a solution of chloride of ammonium as long as it continues to precipitate anything. The precipitate must be collected by filtering, and washed in water, and then dried in the air. A little of this powder heated in the flame of a spirit lamp becomes incandescent; it is then allowed to cool, when it can be used in the following manner:—A piece of it placed at a little distance from the orifice of a tube through which hydrogen is passed, and a jet of this gas being directed upon it, it becomes red-hot, and sets fire to the hydrogen. This may be done, with a like result, several times, but eventually the sponge ceases to be affected by it.

(*To be continued.*)

Dictionary of Photography.

ACETATE OF LIME,—is formed by dissolving carbonate of lime in dilute acetic acid, and evaporating. It crystallises in silky needles which are very soluble in water, and effloresce partially in the air at ordinary temperatures. This salt has been recommended by M. Le Gray, as an addition to the gallic acid bath for developing paper negatives: it causes the picture to develop very rapidly. Addition of acetate of lime to water admits of a larger quantity of gallic acid being dissolved in it. If added in too large quantities in proportion to the gallic acid, the decomposition will be too rapid, and the pictures will darken all over.

ACETATE OF LEAD,—is prepared on the large scale by acting upon metallic lead or its oxide with vinegar. The crude product is purified by solution in water acidulated with vinegar, and crystallised. It is usually met with in commerce in the form of a confused mass of crystals resembling loaf sugar; this and the slightly sweet taste which it possesses, have given rise to its common name of sugar of lead. It dissolves freely in water, and Sir John Herschel has carefully examined the photographic properties of its solution, both in the positive and negative processes. If used strong, in conjunction with iodide of potassium and nitrate of silver in the calotype process, it has the property of increasing somewhat the sensitiveness. Further experiments however, are, necessary before it can be decided whether the advantages attending its use are not counterbalanced by other disadvantages. The addition of a small quantity to the pyrogallic acid developing solution used in the collodion process, causes the pictures to be of a purplish tinge. Mr. Hunt states that paper soaked in a solution of acetate of lead, and, when dry, washed over with a neutral solution of chloride of gold, becomes brownish-yellow, and acquires a slight though peculiar sensitiveness to light. The first action of light has rather the effect of whitening the paper by discharging the original colour, and causing it to become a pale gray tint, which by further exposure increases to a dark slate colour. If, however, it be removed from the light when not darker than a moderate ash gray, and held in a current of steam, the part acted on by the light immediately darkens to a deep purple. Immersion in boiling water has a similar effect. Acetate of lead has also been recommended as an addition to the gallic acid developing solution in the paper process, as a means of increasing the rapidity of the development; it is, however, liable to stain the paper. Acetate of lead is also used in conjunction with hyposulphite of soda to form a *colouring bath* for positives on paper; its action will be explained under that head.

Acetate of lead in conjunction with gallic acid forms one of the most powerful developing agents for collodion negatives. By its means a collodion plate which has received only half the exposure necessary to be given when pyrogallic acid is employed, may be developed

into an intense negative. The process is the invention of M. Frank, and is as follows:—

The plate, having been coated with collodion and rendered sensitive in the ordinary way, is to be exposed in the camera for about half the ordinary time of exposure; on removing it to the dark room, pour over it a saturated solution of gallic acid in distilled water, to which a few drops of alcohol have been added, to make it flow better over the plate. Then put into the developing glass about six or eight drops of a solution of acetate of lead (strength about 30 or 40 grains to the ounce) and pour the gallic acid which is on the surface of the plate back, so as to mix the two solutions together; these will become milky, when pour the mixture back over the plate, and the development will commence at once, and in the course of a few minutes will have attained the intensity requisite for a good negative.

(To be continued.)

A Catechism of Photography.

V.—THE DARK ROOM.

Q. What do photographers mean by the "dark room?"

A. They apply the term, "dark room," to the place in which most of their chemical preparations are conducted, and from which it is necessary to exclude the light.

Q. Must all light be excluded?

A. It is only necessary to exclude the chemical rays of light—namely, those whose influence would act upon the prepared surfaces used in photographic operations.

Q. How is it possible to exclude the chemical rays if light is, in any degree, admitted?

A. Light, as we have already stated, is compound, and not simple. A ray of white light not only contains seven colours, as exhibited in the solar spectrum, but contains three distinct principles—namely, heat, light, and actinism, or that principle by which chemical effects are produced. We may admit to any place the illuminating power of light, and at the same time exclude its chemical influence. This is done by making the light to pass through a medium which will not transmit the actinic rays.

Q. What medium can be employed for this purpose?

A. Orange-coloured glass. A piece of orange-coloured glass, about a foot square, will admit sufficient light for all practical purposes; but great care must be taken that by no chink or hole white light is admitted.

Q. Would it not be equally safe, and more simple, to exclude the solar light altogether, and conduct the chemical preparations by artificial light?

A. This may be done, but it is less secure and less convenient than the plan already named. There is a certain amount of actinic influence in artificial light; and the obscure, unsteady, and insufficient light given by a candle or lamp, is likely to occasion more trouble and annoyance; whereas the light admitted through an orange-coloured glass is steady, and, as the eye soon becomes accustomed to the semi-obscurity which it gives to the room, the operation may be conducted with facility.

Q. What should be the dimensions of a dark room?

A. This depends almost entirely on the operator. It should neither be so small as to inconvenience his operations, nor too large to render everything readily accessible. The chief thing to be sought is, a room which will admit of your operating with freedom, arranging your materials methodically, and from which the light can be effectually excluded.

Q. Will not the light enter by the door?

A. A thick curtain, running on a rod with rings, should be placed just within the entrance, and drawn across immediately the door is closed.

Q. What other adaptation is required?

A. The room should be fitted up conveniently with a table on which the preparation may be conducted, and with shelves for the arrangement of the materials. It is best to set aside one portion of the room for the preparation of the sensitive surfaces, and another for the developing process. Method in this respect is in the highest degree desirable.

Q. Is it not necessary to have a plentiful supply of water?

A. Yes, this is very essential, especially in the developing process; and, therefore, the part of the room chosen for that operation should be fitted with a water tap, sink, waste pipe, &c.

Q. Is the water used in the developing process, and in fixing proofs, of any subsequent use?

A. As it necessarily contains a considerable quantity of nitrate of silver, it is bad economy to throw it away; the silver is precipitated by the reducing agents, and settles at the bottom of the vessels employed, so that it is easily removable.

Q. May the same vessels be used for different purposes?

A. Each glass, each funnel, each wash-tray, should be employed for one purpose only. And everything in your laboratory should be distinctly labelled.

Q. What apparatus is required in the dark room?

A. This, of course, depends on the process you adopt; but earthenware dishes, or gutta-percha trays, glass funnels, measuring glasses, apothecaries' scales and weights, glass stirring rods, and a good supply of chemicals are essential. Everything must be kept in good order: all your chemicals ready to your hand, all your apparatus scrupulously clean. Photography will yield no satisfactory result to a careless or indifferent operator. The art demands the exercise of method, nicety, and cleanliness.

(To be continued.)

Correspondence.

PORTABLE CAMERA AND DEVELOPING BOX.*

FROM MR. T. BARRETT, REIGATE.

The dark chamber Fig. 3 (section) is a box made of deal (say ⅜ inch thick). The back and front pieces are 5¼ inches wide, the side pieces 2 inches, and made to screw on to the ends of the back and front pieces; all are 4 inches high, and cut out at the bottom as at *a b*, Fig. 3, so that when put together they form the projection (*b*) to fit into the cell at the top of the camera, and also to fit the baths. The flange, *a*, rests on the camera and bath box, and helps to exclude the light. Inside the box at C are deep grooves cut in the thickness of the wood for the shutter S to slide into, to exclude the light when the dark chamber is out of the camera or bath box. The centre of each side of the box (dark chamber) must have a V groove fitted corresponding with the centre of the cell in the camera, when placed in it, for the plates to slide in. Covering the box is a black silk bag lined with yellow silk, which must be long enough, beyond the top of the box, to contain the plate when it is drawn up and rests on the closed shutter S (see fig. 3). The lower edge of that part of the box which goes into the baths should be well varnished with *spirit* varnish, or covered with a thin layer of marine glue; the *grooves* also. The *modus operandi* is as follows: Having spread on the ground a square of the black glazed cloth lined with white, to keep all the apparatus

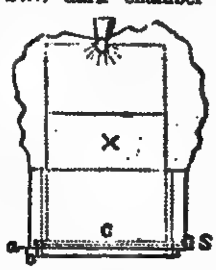


Fig. 3.

* Continued from p. 80.

in view, and to cover it in case of rain. Having taken out the plate box, I screw the camera on to the tripod stand through a hole in the case; then slide in the thin piece of wood (6), and put the piece (5) into its place, screw in the lenses and place the focusing glass through the cell in the camera, so that the back of it touches the raised back of (5). Having focussed the object, take out the glass and slide in the back shutter. Then take the baths out of the box, put the clamps into the lid, and reverse the box. The baths are then put into their respective cells, and the tops lightly put over to protect the contents from dust. Then take a plate from the plate box and sliding it into the "dark chamber" (which should have a mark on the silk to show the front), fasten it with the clip (9), the end is then pushed out of the chamber, and having been wiped quite clean, the collodion is poured on and the chamber immediately placed in the bath S. When the plate is sensitised it is drawn up and the shutter closed. Then placing it in the cut or cell in the top of the camera the plate is pushed down to touch the back of the piece (5) (which can be felt); it is then exposed, and after being drawn up, and the shutter closed, the chamber is then placed in the bath D. When the plate is developed, which should be almost immediately if the baths are in good working order, *especial* care must be taken not to draw it up again, but the clip must be removed and the chamber taken out of the bath, leaving the plate in it. If found not sufficiently developed it may be returned to the bath, resting the top against the plate to keep out dust. I find no prejudicial change takes place after development, though examined in the sunlight before fixing. The plate is then washed, fixed with the hypo., well washed, and returned to the plate box, *collodion end upwards*. If plenty of water be not at hand, the fixing may be deferred, but the developer *must* be washed off. The collodion used should have been iodised some time, as it gives denser negatives than fresh collodion; two drops of pure glycerine should be added to each ounce. The silver bath should consist of 30 grains *fused* nitrate silver to the ounce of distilled water. The bath must be saturated with iodide of silver by immersing a plate coated on both sides with freshly iodized collodion, leaving it in the bath all night. The developer 30 grains protosulphate of iron, and 4 grains citric acid to the ounce distilled water. It is most important that the silver bath should be kept strictly neutral. If at all acid the negatives will be thin and streaky. It should be tested with blue litmus paper, and if found to redden the paper, it must be neutralised by adding one minim of a saturated solution of carbonate of soda in distilled water to each ounce of the bath, or less if only slightly acid. The baths must be filtered till quite clear. Both baths should be filtered occasionally, and when going any distance, the liquids might be carried in bottles holding a couple of ounces more than required for the baths, which should not be filled for use higher than will cover the scratch across the plate, otherwise the bottom of the dark chamber would touch the liquid, which it is better it should not do. Both ends of the plate may be made available by covering the finished negative with gutta percha dissolved in benzole, care being taken not to *slide* the clip off when removing it.

PAGES FROM THE NOTE BOOK OF A TRAVELLING PHOTOGRAPHER.

SIR,—I am very glad to see that you do not exclude from the "PHOTOGRAPHIC NEWS" matter of general interest, even although it does not point out the superiority (often imaginary) of one process over another, or the relative advantages or disadvantages of the dry collodion process. Of course, as a photographer, I do not undervalue the importance of these subjects; on the contrary, it is because I find so much matter for serious reflection in the "PHOTOGRAPHIC NEWS," that it is a relief to my mind to turn to the narratives of personal experience which occasionally appear in it. Besides, it is easy to perceive that an advantage is derived from publishing these papers, apart from the mere pleasure which your readers may derive from their perusal. They encourage a man to persevere in his attempts to obtain views of beautiful scenery or monuments, under circumstances of difficulty which would, in all probability, induce him to content himself with obtaining pictures which, if they were less interesting, would have the recommendation of being more accessible, when he feels that, if he has anything to say, there is a channel open to him, by means of which he may address thousands of more or less interested people, instead of those alone, whom he meets by his own fireside.

I have myself travelled some hundreds of miles with the camera; not simply with the object of obtaining photographs, but sometimes on business which rendered the possession of the camera of great value to me; and, on other occasions, for pleasure, which was greatly heightened by the power of bringing away pictures of the more striking scenes I visited. Indeed, there are few portions of the continent with which I am not more or less familiar; and I will, with your permission, and with the assistance of my note-book, give your readers some account of a few of my wanderings. I do not imagine that they will be read with the same interest as those of your Algerine correspondent, who has the advantage of being on comparatively untrodden ground; but, on the other hand, they shall not be mere catalogues of collodions, papers, and processes. It is somewhere related of a Scotchman, that he wrote a part of a tragedy, and took it to Garrick for his opinion; who returned it to the author, and advised him not to finish it, as his talent did not lie in that way. The author took the advice, and went home and wrote the two first acts of a comedy; which he hastened to submit to Garrick, thinking that he *must* be successful this time, but was again told that his talent did not lie that way; upon which he exclaimed, in a tone of surprise,—"Why, David, didn't you tell me that my talents did not lie in tragedy?" "Yes;" replied Garrick, "but I did not say they lay in comedy." "Oh! but,—" exclaimed the Scotchman, "if they don't lie there, where the de'il do they lie, mon?" Now I do not, like the North Briton, imagine that I have any particular talent for the grave or the gay; but I merely propose to give a simple statement of what I saw and did most interesting to me, on my photographic tours.

About four years ago I supplied myself with an ample stock of necessaries for all photographic purposes, and left England, with the ultimate intention of going to Hungary; but, with ample time at my disposal, to visit any places of interest on the road. My first photographs were made at Bruges; almost every street of which contains a building or buildings capable of tempting one to pitch the camera. It has also the advantage of possessing a number of idle vagabonds, who swarm about you at the railway station, and insist upon showing you the town, and who can easily be made available for transporting the materials requisite to enable you to gratify the temptation. I would, however, advise any photographer who may follow my example, to adopt the same precautions to guarantee the safety of their solutions as I did. I had every bottle carefully cased in gutta percha, rising nearly level with the top of the bottle, and with a sliding cover of the same material, both of a sufficient thickness to preserve the bottles from damage, whether tossing about in a railway carrage, or in the careless hands of a porter; and, even in the event of a bottle being broken, little, if any, of the solution could escape.

The whole of the bottles, camera, &c., fitted closely into a strong leather case, like a portmanteau, with straps, by means of which it could be fastened to the back of a mule, or fitted to a man's shoulders. I may here remark, that nothing is so likely to cause vexation to a man who proposes to make a photographic tour in unfrequented parts of the continent as the possession of one of those so called portable cameras, so limited in its capacity that an accident to one of the bottles (irreparable in such a case) may effectually destroy all possibility of his carrying out his intention. After all, the portability is only a question of degree; if you

carry it yourself it becomes heavy before you have gone half a mile, and if you hire a man to carry it for you, it may just as well be ten pounds heavier. Certainly where a man is in the habit of "taking his camera in his hand, and sallying forth in search of the picturesque," as a recent photographic publication has it, it becomes an object of importance to reduce the weight of the apparatus as far as possible; but this appears to me a very unsatisfactory mode of proceeding. The plan I have almost always adopted has been, to visit the neighbourhood of the hotel or inn where I have been staying, and mark the spots which interested me most; and then one day with the camera has generally enabled me to get all the views worth having; and, as I generally hired a horse to carry my apparatus, I have been able, by starting very early in the morning, to take views nearly twenty miles apart on the same day. Another advantage attending this plan was, that I knew exactly where water was to be found; which, as I almost invariably use wet collodion, some advantage.

I dare say most travelling photographers have adopted a similar contrivance for carrying water under similar circumstances; but, in case any of your readers may not, I will just mention that, before leaving England I got made for me a strong waterproof bag, or rather bottle, capable of holding a gallon of water; a narrow strap round the mouth effectually prevented the escape of the liquid, and a second strap and buckle served to suspend it. In this way I could either take enough water to last me all day; or just sufficient to serve until I reached a spot where I could obtain a fresh supply. Perhaps, while on the subject, I may as well say that my tent is one of my own invention; and is, in my opinion, infinitely better than those in general use. In the first place, I abandoned the tripod, and instead thereof, I substituted an upright hollow cylinder of brass, jointed like a fishing rod, with the exception of the second joint, which works up and down like the tube of a telescope, and is fixed at any height by means of a screw. The bottom joint was furnished with a spike about five inches long, for thrusting in the ground; and the top joint had five thin iron arms, projecting at right angles from its summit when in use, but which could be lowered, precisely in the same manner as an umbrella, when not in use. From the sides of two of these arms there hung two flat pieces of iron, about half an inch in width, the bottoms of which were curved at right angles, so as to slide under two flat staples at the sides of the camera, which was thus held in a perfectly firm and immoveable position.* The tent covering was a voluminous mackintosh wrapper, lined throughout with a light yellow woollen material. When I used it as a wrapper, the lower part was looped up, but when I used it as a tent, this was let down, and fastened to the ground by thin steel pegs attached to the tent, about four inches from the bottom. The advantages of this tent were, lightness, the facility with which it could be put together, its usefulness when not in use as a tent, and its greater capaciousness when in use as such. I have spent in it, in company of two friends, many hours thoroughly protected from the rain, which was descending in torrents; and perhaps some who read these lines may remember when they, four in number, were indebted to a photographer's tent, in the lower Pyrenees, for two hours' shelter from a storm, which would have drenched them to the skin in two minutes. On more than one occasion I have spent the night in it, from preference; in order to avoid the nasty, close-smelling, vermin-haunted bedroom of an Italian road-side public-house. Nor is it vermin alone one has to dread in these places; I slept, quite recently, in a room at an inn where a guest had first stabbed the landlord, and then thrown his body out of window. The occurrence was a strange one. The guest had been drinking freely, and had foolishly shown a considerable sum of money he had in his possession; which so excited the cupidity of the landlord, that he arranged with his son to murder him, and throw his body out of window; the son's share in the transaction was to be limited to the digging the grave, and burying the body. From some cause or other the intended victim became suspicious of evil designs on the part of his host, and determined on going to bed without undressing. About midnight he woke out of a light doze, and saw a dark figure stealing towards his bedside, in whose hand he could distinguish the glimmering of what he took to be a knife. Without waiting to be attacked, he sprang from the bed upon the would-be assassin, wrenched the dagger from his hand, and, without a word being uttered by either of them, the landlord sunk to the ground, stabbed to the heart with his own weapon. Fearful that there might be others not far off waiting to assist in his removal, the guest crept quietly to the window, and opened it, with the intention of dropping down and making his escape; but the moment he opened the window, he heard a man who was beneath it tell him to make haste and throw the body out, as the grave was quite ready. Taking the hint, he went to the bed, drew the sheets off, and wrapped the dead body of the landlord in them very carefully, and then lowered it out of window into the arms of the son. His next step was to walk quietly to the street door and let himself out, and then to hasten to the police station, where he related what had happened, and was accompanied back to the inn by a party of the police, who found the son in the very act of throwing the dirt in the hole upon his own father's body. He was compelled to dig the body out, and was directed to open the sheets; when, to his horror and consternation, he found that he had got the wrong man. He confessed the plot at once, but had not been hanged when I was there. Accidents of this sort are rare, as far as we know; but when we consider how many families there are, one of whose members has disappeared, and been no more heard of, the thought naturally suggests itself—what has become of them? I would therefore advise any photographer who proposes making a solitary trip to an unfrequented part of the continent, to provide himself with a revolver as a means of protection. It occupies little space, and is "material guarantee" for the safety of one's property. I have never found it necessary yet to make use of mine; and, indeed, I am afraid that whatever danger I was in, I should not have the heart to take the life of a fellow-creature. It is possible, though, that the sight of it may have saved me from the necessity of using it, for when I have found myself in a solitary glen, I have always displayed it conspicuously to any ruffianly-looking fellow I may have observed approaching; and I have met with a few under such circumstances. Such risks as these, however, are not worth a thought, in comparison with the pleasure to be derived from visiting foreign countries with the camera. Some of the happiest hours of my life have been owing to my travelling with that instrument. It has been a passport to many a drawing-room in country houses, which, otherwise, I should never have seen; and on no occasion when I have desired to take a view of an antique château, and have sent in my card to the proprietor with a polite request to that effect, have I been refused; and, no doubt, my experience resembles that of other photographers among my countrymen. In these cases it is an advantage to be alone, and a foreigner. VIATOR.

*We may possibly misunderstand the above description of our correspondent's camera-stand, but it seems to us a rather shaky concern, and unworthy of VIATOR's usual ingenuity.

THE "PARFAIT" STEREOSCOPE.—We have recently had submitted to us a stereoscope bearing the above title; and though, in these days of progress, it would be rather rash for us to say that it really is perfect, yet it so far surpasses any that we have seen in the matter of portability and compactness, that we have no hesitation in pronouncing it to be the best in those respects yet invented: for more complete particulars we must refer to the advertisement in another part of our paper.

THE *Daily News* announces that Nadar, the well-known French photographer, is about to take a bird's-eye view of Paris from a balloon, by means of the camera.

Photographic Societies.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION, MYDDELTON HALL, ISLINGTON.—WEDNESDAY, OCTOBER 27TH, 1858.

Mr. Barber read a paper "On the Causes of Failure in the Oxymel Process." He used three vertical baths—one for the nitrate, another for the washing, and another for the oxymel; and in the last only he traced a failure. In one case, it contained iron, producing a misty, foggy development, which might be increased in intensity to any amount; but the picture remained, as it were, buried beneath it. Whether that emanated from impurity in the charcoal used for bleaching the honey, or was contained in the gutta percha of the nitrate bath, he failed to discover, though he discovered an excrescence of metallic silver on one part of the nitrate bath; thus proving the presence of a base metal. By both changing the bath and abolishing the use of charcoal, he got over that difficulty. The ordinary source of iron in the oxymel arises, Mr. Barber says, from making it in an iron boiler imperfectly tinned. Mr. B.'s method is first to mix some chalk with water, then add it to the honey, and boil; after which turn it into a deep vessel, and when cold, pour off from the grosser sediment. Again heated and clarified with white of eggs, it will run rapidly and brightly through a strainer or paper filter; after which, it is converted into oxymel by the addition of acetic acid. Almost every sample of honey gives an acid re-action to test-paper, probably derived, in the first instance, from the fumes of sulphur used in the destruction of the bees. The object for adding the chalk is to neutralise this, and prevent its attacking the apparatus in which it is made; it is also of importance in brightening the product. The slightest trace of iron is highly detrimental. In another case, his oxymel bath contained nitric acid. In the spring of this year he took a few pictures quite equal to any he expected to obtain from a preservative process. After three or four months, he found that with the same oxymel he could get no density, and only a plate with unmistakeable nitric acid symptoms. In spite of the washing, some nitrate of silver will find its way into the oxymel bath; and it being a property of nitrate of silver, in contact with light and organic matter, to become reduced, it was evident that operation had been going on, for his honey had become much darkened in colour; consequently, an equivalent of nitric acid must at the same time have been liberated, or entered into some other molecular arrangement productive of the same effect. He neutralised that by dissolving some chalk in acetic acid, adding the resulting acetate of lime, which completely righted it. Probably acetate of magnesia would be a better addition, it being a more deliquescent salt. Any alkaline acetate may be employed for the purpose; the nitric acid of course unites with the base, setting free the acetic acid. Mr. Barber produced several pictures in illustration of his facts.

Some discussion ensued, and the chairman then produced some specimens of Fothergill's process by Mr. Morley.

Dr. Riley then addressed the meeting at considerable length upon the method of saturating the collodion film with albumen. He related the results of many experiments, and stated that albumen, which had hitherto been considered an accelerator, had now, in his hands, become a retarder of the actinic rays. It struck the Doctor that that was because the albumen filled up the pores, so to speak, of the collodion film, thus causing the film to become less "*structural*," and depriving the actinic rays of their former power. The Doctor knew that nitrate of silver had the power of coagulating the albumen; and the thought struck him that, if he was to take the *collodion albumenised* plate, reimmerse it in that bath, and ultimately wash it with distilled water, that he should restore the *structural* condition of the film; he tried the experiment, and the plate (which was before almost inactive in the camera) produced a negative in fifteen seconds by an ordinary quarter-plate lens, —the light being at the time unfavourable, the result was marvellous — the sensitiveness of the plate was perfectly restored. The Doctor then explained his many experiments with iodides. The metallic iodides had the property of coagulating albumen, which the alkaline had not. He then iodised some collodion with iodide of cadmium, and in other respects followed the formula of Mr. Fothergill, and obtained a negative in 10 seconds, with blisters. He then tried 3-4ths iodide of cadmium and 1-4th iodide of potassium, and procured a negative in 6 seconds, with the quarter-plate lens (*without* the second dip), but still having blisters. He then tried whether he could not do without adding any of the iodide of cadmium and without plunging his plate in the nitrate bath to coagulate his albumen, and simply plunged it into boiling water, which at once coagulated the albumen; and he obtained his negative with 6 seconds' exposure, but liable to stains. That, the Doctor thought, proved his theory, that it was due to the altered structure of the film, and not to any chemical action. The Doctor illustrated his statements by negatives.

Mr. Legg then, after some further discussion, produced a contrivance for changing plates in the open air, which was extremely simple, light, and inexpensive.

Mr. Hislop exhibited his new apparatus for taking portraits of children and objects in motion.

Mr. Bingham then exhibited a plate box, with deep yellow glass ends, for the purpose of exhibiting the contents to Custom-house officers, without exposing the plates to the light.

Miscellaneous.

Improved Self-supporting Funnel.—There cannot be the slightest doubt but that nearly all photographers have at one time or another felt how cumbrous the present funnel-stand is when placed upon the laboratory table, where every available inch of space is valuable to enable the operator the more readily to have access to the bottles or instruments which may be necessary to the successful carrying out of an experiment or operation. We can easily conceive this to be the case even in a laboratory where there is every accommodation, but how much more is it felt where the laboratory is small and inconvenient, and where every nook and corner is pressed into service. We have recently seen a new style of funnel-stand, which entirely dispenses with the present clumsy machine of wood or iron. It is composed of gutta percha. It is a funnel and foot combined in one, which can be applied with the greatest ease to filter baths into horizontal dishes, without calling into requisition the wooden funnel stand. The taper end of these funnels is suppressed to give greater facility in cleaning it. The principle has been submitted to the approval of the French Photographic Society at Paris, who, as we hear, very highly appreciate its utility. It is gratifying to learn, that in an article, concerning the utility of which there can be no question, the inventor has not reserved to himself any right, but that he has freely and generously placed it at the disposal of the photographic world; therefore any photographer who may desire to avail himself of this useful little article of laboratory furniture, can at once have one made. We cannot do less than thank its contriver Mons. George de Bellio, in the name of the photographic world, for his useful and unique idea.

Hermetically Sealed Tubes for Collodion.—We have had specimens of these tubes forwarded to us, for the particulars of which we refer our readers to our advertising columns. It will be seen at once that this is an important invention for the purpose of enabling us to keep collodion for any length of time, either for exportation or otherwise; and, at the same time, it gives us the advantage of having a quantity always at hand, which retains all the strength of newly-made material. The contrivance is very simple. A glass tube is taken with a capillary orifice; it is then filled with the liquid; after which the orifice is sealed by merely applying it to a gas jet or the flame of a spirit lamp. The advantage of this is, that we can always have a supply of good collodion, which, our photographic readers know, is not the case where corks or stoppers are used.

A Relic of the Primeval Creation.—In speaking of a globule of water which has been discovered to be visible in the centre of a natural crystal, an American contemporary remarks: If there is any truth in geology, this water is one of the most ancient drops of water in the universe, much more ancient, in fact, than the water which overwhelmed the earth in the time of Noah. To use the words of Dr. Bouchelle, the owner of the crystal in question, this drop is one of those which were veiled in thick darkness when the earth was without form and void. The crystal belonging to one of the primitive rocks, the water therein contained must be primitive also, and would thus date from the early days of the creation.

Photographic Notes and Queries.

TAKING PHOTOGRAPHS THROUGH YELLOW GLASS.—GRADUATED BACKGROUND.

Sir,—In vol. i. p. 61, of the "News," you mention the fact of the sensitive collodion plate being affected through *four or five thicknesses of yellow glass*. I have been long under the impression that a plate may be sensitised, developed, or even exposed to sunshine through yellow glass, without being in any manner affected. For several years I have prepared plates out of doors, and developed them; the necessary amount of light being admitted to the operating room through a single sheet of yellow glass. If the sun shines strongly through the yellow window, it has had a tendency to create a faint or fogged image; but strongly diffused light has never appeared to me to affect the sensitiveness of the plate. I am now working Fothergill's dry process, with great success; and have a portable changing apparatus, fitted with yellow glass (one thickness), and, hitherto, my plates have been unimpaired by exposure to the yellow light.

Is this idea a fallacy? If so, the sooner I find a remedy, the safer I shall feel in out-door work.

A correspondent in your paper wishes to know how a light graduated background may be managed; let him proceed as follows:—Take a negative, and, from that, print a positive on thin paper; cut the figure out with a pair of scissors; blacken both figure and background in the sun and fix the latter, by gumming the corners, on the face of the negative. Print a positive again, and the background will be white; put the figure cut out of positive No. 1 over the figure in positive No. 2, and put them in the pressure frame; make a kind of ball (in your hand) of your pocket handkerchief; expose the positive to the sun, and keep moving the handkerchief over so much of the centre of the figure as you wish to remain white; the figure can't be affected through the paper which covers it. If care is taken the figure need not be covered, excepting by the handkerchief, which must be kept moving in small circles.

Experience will teach the rest. I learnt this dodge in 1848, in Germany.—I am, truly yours, S. S. B.

P. S.—Another simple way of proceeding is, by having a black piece of velvet, with a hole cut in the centre rather larger than the lens, hung by the two corners to wires, or pieces of wood, fastened to and projecting from the upper corners of the camera, the distance between the lens and the velvet being about 10 inches.

A white rag will, of course, give a *white* halo to the portrait.

The black velvet gives a black halo, and is improved by a *white* background being fixed behind the sitter.

[The yellow glass referred to in the article above mentioned, was not the ordinary glass with which dark rooms are sometimes glazed; for this latter purpose a much darker variety, *dark orange*, is the best. The glass we mentioned as having used was very pale amber coloured; and was worthless for protecting collodion plates, as the experiments there mentioned would show. We are much obliged for the information on the subject of backgrounds.]

BROWNING OF CALOTYPE PAPER.

Dear Sir,—I am an old hand at calotype, and, like all who know that beautiful and simple process, still entertain a strong regard for it, in spite of the numerous dry glass processes. Latterly, however, that is, within the past twelve months, I have met with an annoyance I was never before troubled with,—a tendency to the browning of the paper even on sensitising, and that during the autumn and winter months, and with the most dilute solutions. That this cannot be due to anything in the iodising I feel certain, as it has occurred not only in paper carefully prepared by myself, but also in other samples procured from trustworthy sources. The paper I have always used is Turner's, iodised by the single wash, and sunned. I am inclined to attribute the matter to some new ingredient introduced into the paper in the later makes, perhaps in the sizing, and which has a tendency to decomposition in the presence of the chemicals. If you or any of your correspondents can throw any light on this, to me, puzzling subject, I should be very much obliged.

I have never met with this annoyance in Whatman's paper, which works beautifully sharp and clean to look down upon, but its granular texture is fatal in the printing process. Robert W. Hall.

[This is a subject of great importance to all paper photographers, and we should like to see it well discussed in our columns; we have latterly met with somewhat similar annoyances. It is well known that French paper, although suited to most purposes in photography, will not answer for the calotype or similar processes. It is very possible that English makers, in their desire to make paper which should equal the French make, have introduced some material as a *size*, which produces the above-mentioned deleterious effect.]

MR. Mc CRAW'S PROCESS.

Sir,—The seeing that you are ever ready to assist the unfortunate, and to give advice gratis, induces me to draw your attention to your journal, vol. i. p. 50, where there is an account of a cheaper and more permanent way to prevent the fading of photographs. I at once set to work to prepare some paper, paying strict attention to the rules laid down; consequently a number of yellow sheets were prepared the over-night, and anxious enough was I for the morning light, to test the result. I exposed one sheet under a good negative, and watched the thing with eager eyes, expecting to see the rapid change, which was to be in less time than the nitrate; but, alas, I was doomed to disappointment! After one hour's exposure there was a faint impression; and I accordingly set to work with the various washings, and, at last, brought out a smudgy, inky subject—but what was it?—instead of a positive, a negative. I tried another with like success. I enclose two pieces of paper for your inspection; No. 1 has been exposed to the light two or three hours, the other has not been brought out into the light. Perhaps some of your correspondents would give us their opinion on the subject; or the learned photographer himself, might enlighten us. For my part, at present, I am only too glad to go back to the original course. C. B.

[A few experiments of our own have led to somewhat similar results. We should feel obliged if some more successful experimentalist would favour us with his experience.]

COLLODION WHICH DEVELOPES ITSELF.

A correspondent writes to us and says that he has been making collodion with about 3 or 4 grains of gum benzoin dissolved in each ounce, and he states that if the plate is left untouched in a dark room for about an hour after exposure in the camera, the picture not only becomes visible, but gradually developes itself to a very considerable extent, and that by thus pouring over it the usual pyrogallic solution an intense and fully developed negative is instantly obtained. It is to be regretted, however, says our correspondent, that the plate will only remain *tolerably* sensitive for about ½ or ¾ of an hour after immersion into the nitrate bath, and that therefore, as a dry process, there appears to be little advantage in it. He also states, that immediately after exposure in the camera, the plates will only bear the action of a very weak developer, and that he has found that he could not bring a picture out unless he gave it ¾ of an hour to develop itself, but that *then* the pyrogallic solution (1½ gr. to the oz.) immediately produced a dense and fully developed negative.

NEGATIVES AND POSITIVES WITH THE SAME BATH AND COLLODION.

SIR,—Having taken, and carefully read, your very useful paper, the "PHOTOGRAPHIC NEWS," I do not find that any of your correspondents know of a way to take both negatives and positives with the same bath and collodion; and if this be the case, I fancy the information would be of great use to the photographic world, and would be acceptable to your publication. Having this idea, I enclose you the list of chemicals I use in order to obtain this advantage. And hoping you will find this of use, I am, sir, your obedient servant,

AN F.C.S.

BATH.

Distilled water	1 ounce.
Nitrate of silver	30 grains.

POSITIVE DEVELOPING SOLUTION.

Clean water	1 ounce.
Proto-sulphate of iron	15 grains.
Nitric acid	2 drops.
Acetic acid	4 "
Alcohol (more if the plate is greasy) ..	1½ drachms.

NEGATIVE DEVELOPING SOLUTION.

Distilled water	1 ounce.
Pyrogallic acid	3 grains.
Citric acid	3 "

(When used add ½ of the bath to the above solution.)

FIXING SOLUTION.

A mixture of cyanide and water; more water to be applied if the plate is greasy.

The negative solution is to be used before the cyanide, if you want a negative.

CORRECTING A FOGGING BATH.

SIR,—I have gained much useful information by reading your "PHOTOGRAPHIC NEWS," both from your own remarks and those of your many correspondents, and therefore hasten to send the following means of correcting a negative bath from fogging, supposing from the letter of *C. P. S.* that it is not generally known.

Put into the bath a few grains of carbonate of soda, shake it well up, filter it, and then add a few drops of glacial acetic acid sufficient to tinge the litmus paper a light pink. I am working a negative bath corrected six months back in that way, and have never had a foggy picture since. S. M.

Stratford.

[This plan is sometimes very successful, but we have at other times found it fail. Sunning the bath has then proved of more use.]

VARNISH FOR PAPER STEREOGRAMS.

SIR,—Dissolve gelatine in cold water, apply a little heat after soaking an hour or two, to form a size. Brush this evenly over the picture, after mounting, and dry for 12 hours; when quite dry, have ready a solution of gum damma, made by dissolving 1 ounce gum damma in 3 ounces coal naphtha, which must be allowed to stand, and the clear portion then poured into a perfectly dry bottle; with this varnish again coat the picture, and a clear bright coating will remain on the print in a few minutes. This varnish answers equally well for glass negatives.

JOHN HEYWOOD.

SPOTS ON COLLODION PICTURES.

SIR,—I have been considerably annoyed with spots, and have tried new baths, &c., but all to no avail; when I thought I would try rain water to wash the pictures. They are now quite free from those troublesome spots. I am no chemist, but my opinion is, that the spots are caused by the action of carbonate of lime, which is in most waters. By washing one picture with soft water, and another with hard, you will find the former quite free from spots, and the other spotted, according to the quantity of lime present in the water. THOMAS REID.

Dunfermline.

REMEDY FOR THE FILM WASHING OFF.

SIR,—In your last number you wished some correspondent to suggest a remedy for the annoyance of the film losing its adhesion to the glass. When I find, on developing, the film has a tendency to become loose, I put gum round the edges of the glass, and do not intensify the picture until it is nearly dry; the gum prevents any further loosening, and is not liable to any objection. W. D.

DARK MARKS LIKE STREAKS OF MUDDY WATER ON THE NEGATIVE.

Have any of our correspondents met with the above fault? and if so, can they oblige us by suggesting a remedy?

ANSWERS TO MINOR QUERIES.

HOW TO COMMENCE PHOTOGRAPHY.—We insert the following letter, as many of our correspondents are in a similar difficulty, and perhaps a full answer to one, will be useful to all:—DEAR SIR,—I commenced the practice of photography a little while ago, without any more knowledge of it than I obtained from Hunt's "Manual," a couple of manipulation books, and three or four chemical works. I commenced with portraiture by the positive collodion process; about three-fourths of the photographs I have taken have been complete failures from one cause or another; and those which were not downright mulls, were, excepting two or three, minus the eyes, and the eyes won't come, and I can't make them; they are sharp and clear enough on the ground glass, but they are not at all on the glass plate. Now Mr. Editor, will you be kind enough to advise me as to whether I had better follow the advice you gave to E. B. G. in No. 2 of your valuable journal, and try the talbotype process, or continue the collodion, or tell what I had better do. It is my ambition to become a first-rate photographer; although I only practise it for amusement my heart is in the science, and I hope, if you will now and then favour me with your advice, to produce as beautiful photographs as the most experienced artists. I have a ¼ size double combination patent lens which I purchased; the rest of my apparatus is home made. If you think I had better practise the talbotype, will you please to inform me what I had better practise until that process appears in your "Catechism of Photography." Trusting you will think this worthy of an answer, I remain, yours obediently, *Earnest*.—[Photography must be learned in the same way as any other art or science. A firm foundation must be first laid in the general principles upon which the science is based; and when these are well mastered, the pupil should commence with the easiest and simplest experiment, in order to assist the hand, eye, and judgment, in the proper understanding of the complex phenomena which will constantly be brought under the notice of the earnest scientific photographer. If EARNEST had been desirous of becoming a first-rate painter, he would have smiled at the idea of commencing to paint portraits, or academic pictures, before he barely knew one colour from another, and could not even draw correctly; but that is just what he has been attempting in photography. Portraiture and landscape photography are near the top of the ladder, and to reach them you must mount up from the bottom. We are giving the "Catechism" and "Chemistry" for the express purpose of assisting such as EARNEST; these two departments of the "NEWS" must be thoroughly well mastered, step by step. We do not wish, of course, to limit the pupil's experimental energies to those two branches; indeed, we think that very much good may accrue from a simultaneous dabbling being carried on in almost all of the tempting processes which from time to time appear in our pages; but it must always be remembered that these are written for advanced photographers, and beginners attempting them will certainly meet with failures and disappointments. It is these very failures that we wish them to have; for, in the commencement of an experimental science, failures teach far more than success,—the latter, when accomplished, being simply *success*, but the former, when overcome, is *experience*.]

TO CONVERT ALLOYED SILVER INTO PURE NITRATE OF SILVER.—*S. M.* Alloyed silver consists of silver and copper; to convert it into pure nitrate of silver proceed as follows:—(1.) Dissolve the alloy in nitric acid, evaporate to dryness, and heat the residue carefully and uniformly in a glass, porcelain,

silver, or platinum dish, till it fuses, and the nitrate of copper is decomposed with intumescence; then keep the mass at the same temperature till it fuses tranquilly, no longer exhibiting a greenish cast, and a sample of it dissolved in water, filtered, and mixed with ammonia, no longer forms a blue solution. If the heat be too low or unequal, a portion of the nitrate of copper remains undissolved. at too high a temperature, the nitrate is also decomposed, and silver separated, which may be recognised by remaining behind when the oxide of copper is dissolved in sulphuric or hydrochloric acid. The mass, when cold, is dissolved in water, the solution filtered from the oxide of copper, gently evaporated, and left to crystallise. Or (2) dissolve the silver in nitric acid, add common salt to throw it down as chloride, and then well wash it as follows:—Pour water on it, and stir well; allow it to subside; carefully pour off the clear liquid, and then repeat the washing until the water has no longer an acid reaction. This chloride of silver may be decomposed in several ways.—*a.* A crucible is nearly filled with an intimate mixture of 3 parts of perfectly dry chloride of silver, and 1 part common resin; a gentle heat is applied at first, whereupon the resin burns with a flame coloured green by the hydrochloric acid, formed from the chlorine of the chloride of silver, and the hydrogen of the resin; the heat is then raised to the melting point of the silver, 1 part of borax being added, and a few slight blows given to the crucible to accelerate the melting together of the silver.—*b.* The moist chloride of silver is placed in contact with iron or zinc and water, to which, in order to accelerate the action, a small quantity of hydrochloric or sulphuric acid may be added; and the reduced silver is quickly washed, first with acidulated, and afterwards with hot pure water. This plan is easier than the plan (*a*) with resin, but is not so certain to yield pure silver, as a small quantity of the zinc unites with the silver, and cannot be removed by the acidulated water; so likewise do some of the impurities of the zinc or iron. In whichever way the chloride of silver be decomposed, the silver is to be dissolved in pure nitric acid, the solution evaporated carefully to dryness, and heated to near the fusing point for about half-an-hour; then redissolved in water, filtered, if necessary, evaporated slowly, and crystallised. Another plan is (3) to dissolve the impure silver in nitric acid, and to the dilute solution add strips of copper, and set aside in a warm place for 24 hours. All the silver will be precipitated in the form of a gray powder; wash this thoroughly, and then digest it with fresh quantities of ammonia as long as that liquid acquires a blue colour; the silver is then to be converted into nitrate of silver as above.

To Extract the Silver from Old Filters, Unused Positive Paper, &c.—*T. Clark* has several pounds of little pieces of filtering paper saturated with nitrate of silver. How can the silver be recovered from them? Place a crucible on the fire, and when red-hot introduce the pieces of paper a few at a time; they will burn easily with slight scintillation, and leave an ash, which must be carefully preserved and mixed with about one part of borax and a little nitre (these quantities, however, are unimportant), and exposed in the crucible to a bright yellow heat for half an hour, at the end of which time give it a few knocks to facilitate the settling of the silver, and allow it to cool, and the silver will be found in a button at the bottom of the crucible. For directions for its further treatment see answer to S. M.

Albumenised Paper Spoilt in the Exciting Bath.—*Sol* has a bath for exciting albumenised paper, which after long use becoming discoloured was filtered through chalk; it came through quite clear, and a few days afterwards, was used to excite some paper; the first few sheets turned out very well, but afterwards the albumen came off the paper, and formed a white precipitate at the bottom of the dish. The reason for this is obvious. Filtering through chalk removed the greater part of the silver from the solution, which remained behind as carbonate of silver; the bath was then too weak to coagulate the albumen which, therefore, dissolved out together with the chloride of sodium or ammonium, and precipitated the silver in the bath. Kaolin should be used to decolorise the darkened silver bath, not chalk.

Raised Portraits.—*A Macclesfield Photo.* A very good plan for producing the effect of the portrait in a glass positive standing out from the background is, to place a black background behind the sitter, and, after the picture is finished, to paint (on the plain side of the glass) behind the figure only with some black vehicle, leaving the background clear; when dry, back up with white or light-coloured paper.

Query on Colouring Glass Positives.—A correspondent asks "how to render a collodion positive plate transparent so as to colour it on the collodion side and allow the colour to show through?" We have seen specimens in which the above desideratum was accomplished, but are unable to learn how it was done. Can any of our readers kindly inform us?

TO CORRESPONDENTS.

*** *We are now enabled to promise our readers an impression from a plate by Mr. Talbot's process, with No. 10 of the "Photographic News." As the issue of this will doubtless involve a large additional demand, which it may be somewhat difficult to provide for, we shall be glad if all our subscribers who wish for extra copies will intimate the same one week in advance.*

Struggling in the Dark.—We are much obliged for the suggestion. It is being already carried out in the "Dictionary."

T. G. D.—You will not be able to obtain more satisfactory results than those you describe, unless you purchase an achromatic lens. It will be impossible for you to make one.

Enquirer and H. D.—Articles on the subject will shortly appear.

C. A. B.—The plate must be warmed before pouring on the varnish, and also kept warm before a fire whilst drying.

T. E. N.—The Talbotype and Calotype process are the same. See a previous number.

R. V. Stuart.—Your nitrate bath is very much out of order. Try if any of the plans previously recommended will cure it. (Try sunning it first.) If not, you must make a new bath.

Actinism.—See answer to B.R.M., vol. 1. p. 84.

R. J. S.—Most accelerating agents will injure the bath. Glycyrrhizine in the bath is the best and most harmless. About one inch in thickness of a solution of sulphate of quinine in dilute sulphuric acid, 100 grains to the ounce. Ordinary patent plate will do. The dimensions, &c., of the cell must depend on the size you want it.

G. C.—We do not know how linen or calico can be rendered sufficiently transparent and waterproof to form a roof under which portraits might be taken. We should think that too much light would be obstructed in any case.

R. W. F.—Not injurious. See article in the present number.

R. P.—The quality of pale yellow glass varies very much.

A. Z.—Try the plan of redeveloping, given in a former number.

J. D.—C. O. E.—The stop has been placed in such a position that the field was reduced until it will not cover your glass.—Negative process.

R. D.—See C.P.S.'s letters in a former number. No such bath is known.

A Subscriber.—We are expecting further information on the subject. Meanwhile try iodide of potassium. We have not yet experimented on the subject.

G. S.—We do not know of a way of testing whether the chemicals are in working order by means of a piece of copper.

W. S.—Use hypo., and fix till all the yellow iodide of silver has disappeared.

L. L. B. Cantab.—It will be better to precipitate the silver from the old bath, and make a fresh one. Answer to the other query next week.

Cupidus Scientiæ.—Your idea is totally incorrect in theory. For the note on wood engraving we are much obliged.

Hopeful.—Paper of some dark colour: either glazed or not, to suit your taste.

Excelsior.—Add 1 grain of bromide of calcium to an ounce of your iodised collodion, and 1 drop of nitric acid to your bath. Sulphuric acid is not good in the developing solution, in our opinion; some operators use it, however. What black varnish was used on the picture sent? It seems very good.

Subscriber.—The time of exposure can only be found out by experience. Not much longer than for a positive.

Scotia.—No method is known by which portraits may be taken on paper without printing from negatives. All the necessary details are given; common sense will supply the rest.

R. G.—The print is pretty good. (Why do our correspondents only send spoilt prints? Is not the information they ask for worth a good copy?) We do not think your *alteration* an *improvement*. Advertise.

Bendigo.—The calotype process, like all others, requires practice and experience before good results can be obtained. *Bendigo* should be the last person to be daunted by a little difficulty. Fight against it manfully, and you will conquer.

J. F. M.—We hardly know where you can get all the materials you want at the price named. Thanks for the letter.

X. Y. Z.—Old Hypo.—A. Q. X.—One.—Ignarus.—A Subscriber.—Humbugged.—A Young Beginner.—H. G. T. Our correspondents will see that it is out of our power to save them the trouble which is indispensable in mastering the principles of any science.

Communications declined with thanks:—T. S.—Amateur, Hive Cottage.—W. D.—C. C.—A. B.—G. L. P.—Dr. Syntax.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—H. B. P. Z.—Poor Novice.—J. L.—Half-green.—R. T.—D. W. H.—A. M. P.—A Novice.—Frances.—E. T.—Sphynx.

In Type.—A. N.—C. N. P.—J. L. S.—F. W. B.—A. Molson.—W. L.—C. B.—L. L. B. Cantab.—J. F. M.—Ajax.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., NO. 9.—*November 5*, 1858.

TO OUR READERS.

THE Photoglyph which we propose to give with our next number will be followed, at a short interval, by another larger specimen of this new art, the particulars of which will be duly announced. The delay which has occurred in presenting the first one to our readers arose chiefly from the inventor having wished the steel plate to be highly polished in a particular manner. It being now ascertained that this would cause a further delay, which was deemed unadvisable, a small etching has been selected for publication in our next number, which, though made as long ago as the beginning of August, does not differ in principle from those which are now made by the method fully detailed in our No. 7.

THE PROSPECTIVE ADVANTAGES OF THE NEW ART—PHOTOGLYPHY.

THE public generally is so little likely to appreciate the full importance of the invention of Mr. Fox Talbot, on first reading the details of his invention published in the "PHOTOGRAPHIC NEWS" of the 22nd ult., that we think it will not be superfluous in us to point out one or two of the more important probable consequences that may result from it. All who have seen paintings of scenes with which they are familiar, will remember the difficulty they experienced in recognising, at the first glance, the places represented. It required an effort of the memory to recall the resemblance, notwithstanding the existence of some conspicuous object which there could be little difficulty in identifying. The reason of this is, that the painting is not and cannot be an exact representation; it approximates to that, more or less closely, and that is all. Moreover, the painter idealises the subject, and exhibits it under the most favourable appearance which colour is capable of giving, and this is an additional obstacle to its ready identification. In the case of the photograph this difficulty does not exist. It is true that the beauty derived from a harmonious blending of colours is wanting, but then there is absolute fidelity of representation. The same agent which reproduces the elm beside the village church, will reproduce the rook perched in apparently philosophical contemplation upon it, and the church itself will not be represented without its noisy congregation of jackdaws. Even where the scale of the photograph is so much reduced that these minor objects are rendered almost invisible to the naked eye, the application of a magnifying glass will show that they are represented as faithfully as the larger objects. It is this extraordinary power of reproducing fac-similes that gives to photography its principal value; which value, however, is much lessened by the fact, that these copies cannot last. It may surprise those who have so earnestly advocated the reproduction by this means of fac-similes of rare books and engravings, as well as of the title-pages of such books for the Museum Index, to learn that, if their ideas were carried out, in all probability not one of these fac-similes would remain in existence twenty years hence, and that the index would have to be commenced *de novo*. Hitherto no method of printing photographs on paper has been found capable of resisting the effects of time, and those who have formed collections of these pictures have the mortification of seeing them fade away, and ultimately vanish completely; a matter of comparatively small importance, perhaps, as regards pictures, but a very serious matter as respects photographic portraits on paper. At the time when death or other causes may render these portraits of inestimable value, they will gradually fade, and most likely leave only a faint stain upon the surface of the paper. It may, to a certain extent, console those who possess such portraits to be told that, if they do not suffer them to fade too far before taking them to a photographer, they may have them reproduced with much of their former vigour. To discover some method of overcoming this want of stability, and to make a photograph as everlasting as an engraving, have occupied some of the most able photographers, both in England and on the continent, for years past; and at the present moment there is a prize of 8000 francs, deposited by the Duke de Luynes in the hands of the French Photographic Society, to be given to the man who shall discover a method of printing photographs in carbon; that substance being unassailable by any known chemical agent whatever, and equally insensible to the effects of light. There are several competitors already in the field, and an Englishman, Mr. Pouncy, has produced photographs by a carbon process, as he asserts—for he keeps his method of operating a secret—upon which we have already pronounced favourably. The new process of Mr. Fox Talbot scarcely lessens the desirability of discovering a method of printing photographs in carbon, inasmuch as the labour of engraving a plate greatly exceeds that of printing a small number of photographs. It appears to us that the importance of Mr. Talbot's invention—which it is impossible to over-estimate—chiefly consists in its applicability to the engraving of plates for the illustrations of books, at such a low rate, that even the cheap publications which, with one or two exceptions, are now obliged to content themselves with engraved wood blocks, may, instead of these, give an engraving which will be mathematically correct as regards perspective and the scale of the objects represented. For the illustration of books of natural history of animals, as well as of flowers and plants, this invention is invaluable; and even the most minute microscopical animalculæ (such as the parasite of the parasite of the bee described in a recent number) can be reproduced by photography in the camera, and then transferred to a plate by this process, with the correctness no human hand could give. The paintings which form the pride of our National Gallery, the existence of which is unknown to the mass even of those who reside in this city, may be made familiar to the most remote peasant, by means of photographs engraved by this process. The rising painter, whose work is admitted for the first time to a modest place on the walls of the Royal Academy, may by this invention be made known to thousands who would otherwise not have heard his name till ten or twelve years later. When we consider the immense number of landscape and *genre* paintings, the contemplation of which has given hours of pleasure to a limited number of individuals, we cannot but wish that a similar pleasure should be within the reach of our poorer brethren who lack our advantages. Surely, if the taste of the masses is to be raised by a contemplation of the beautiful, this invention offers the most ample means for accomplishing that object.

Up to the present time the number of paintings which have been engraved has been very limited; this has arisen, partly from the great expense of employing a good engraver, and partly from the limited sale of engravings, prin-

cipally, we think, owing to the high prices it is customary to charge for them. In future, if Mr. Talbot's invention succeeds as well as we believe it will, there is no reason why every painting exhibited should not be engraved, and copies of it sold at such a price that the walls of the poorest cottage may be adorned with real works of art, in lieu of the prodigal son in bright blue, leaning on the bosom of a father in bright red; or, instead of Balaam in a yellow wrapper, with a savage face, and butcherly intentions towards a meek-looking jackass, who appears more like a patch of sticking-plaister than anything else; or, the more esoteric representation of a nude little Cupid, with a lady of striking appearance in respect to colour, sailing down a placid river in a washing-tub.

THE STEREOSCOPIC ANGLE.

SIR,—Absence from London, and much occupation, has prevented my answering, till now, a portion of an article on my work on Photography, which you reprinted from the *Literary Gazette*.

I consider that any discussion upon a subject so technical as the stereoscopic angle, will be more suited to the pages of the journal specially devoted to photography, and therefore, with thanks to the writer in the *Gazette* for the favourable opinion he expressed on my book in the rest of his article, I pass to my argument.

I am quite prepared to maintain the statement I make in my work, namely, that the angle must be varied from the distance apart of the human eyes, for objects at some ten feet from the camera, to "fifty feet for mountains at ten miles, provided always that the *foreground objects* are not *near* the lens."

In writing the foregoing, I admit that the appearances which we see in the "mountains" (?) of Westmoreland and Cumberland were not, at the moment, in my thoughts; they are to the spectator *flat*, in tones of gray, consequent upon their small scale and our hazy atmosphere, when seen at a distance of "ten miles," and have been so represented in art; and were the stereoscopist to endeavour to form a relief in the representation of them which is not apparent in nature, he would be amenable to criticism. But the case is widely different when we treat the Titanic masses of the Alps or Pyrenees, where the purity of the atmosphere, and the colossal scale of the subject, enable us to discern perfectly, at twenty miles, the bare granite peaks standing in distinct relief, their every form made out, their shadows cutting firmly on the pure snow—appearing so perfectly modelled, that the traveller is incredulous when told that a day's journey intervenes between them and him. These are "mountains;" and when I wrote I was thinking of the appearances of the Jungfrau, the Oerteler Spitze, the Maladetta, &c., not of the "green sward" of the Westmoreland hills, and their atmospheric effects.

I maintain that if the cameras for such subjects were to be placed "at the distance apart of the human eyes," the operator had better entirely spare himself the trouble of taking two pictures at all, for the mere *spot* which the point of view would be, in such case, *relatively to the distance from the objects depicted*, might be equally as well represented by duplicates from the same negative. Nay more, to carry the illustration of the principle to a farther extreme, may I ask —if a stereoscopic representation of the sun were desired, which we equally see with the human eyes, distance 2½ inches, or of our satellite—would it be feasible that it should be made at that angle?—and *what stereoscopic effect* would the 2½ inches produce on the 95,173,000 miles, the distance of the former luminary from us? In such a case I should carry out the *same principle* I have advocated; but I fear my "sliding scale" would be far from palatable to those who could not digest my former *moderate* angle. I maintain that, if you attempt to give any stereoscopic representation of the sun, THREE THOUSAND MILES, or more, between the cameras would not be too much for a distance of 95,173,000 miles; and say that one operator was at Paris, the other at Constantinople, with twin instruments, and accurately adjusted chronometers, and that, by these means, pictures were taken at the same instant, we might hope to secure really stereoscopic representations, which would, probably, solve questions of the highest scientific import; amongst others, the nature of the solar spots would be likely to be determined.

It is true that an image of the entire orb of the sun with stereoscopic effect will, probably, never be obtained under any conditions, since the very nature of *self-illumined rotund* bodies in an intense state of incandescence is to appear, to our organs, flat. Take a round bar of iron, heated to a white heat, into a dark apartment; the effect it will produce on a spectator is, of a flat surface, a quality which will therefore apply, in a multiplied ratio, to the intense solar light, against which even the oxyhydrogen lime light appears black. This is not the case with the moon; illumined as she is by the light of the sun, with shadows projected from the inequalities of her surface, we may fairly hope that, *sufficient angle being given*, we may obtain a rotund effect, which will delineate, in a remarkable manner, her structure.

In my opinion the "model-like effect" complained of in many stereographs is due to the crudity of the negatives, and consequent want of atmosphere, scale, and distance, and, in architectural subjects, to the *total absence of figures:* to cite examples—the bridge of Prague is one of the most picturesque subjects in Europe; in the stereoscope it certainly has a Dutch toy-like effect; the buildings rise square, harsh, and abruptly from the ground, without groups of figures and vehicles to serve as a base, and *mark their scale*. And, as atmosphere, let any one compare Heidelberg and the valley of the Neckar, by Ferrier, with his last improvements, its atmospheric distances, the shadowed sides of the buildings reflected into and delicately drawn, with Zion in the Valais, an earlier work by the same hand, in which the "model-like effect" is entirely caused by the heavy black shadows, and *want of atmosphere*. This comparison will at once show how important are the results of *sufficient exposure* and well covered plates, particularly on glass pictures; and that it is erroneous to attribute always to defective angle what may very probably belong to the imperfect rendering of atmospheric perspective. Apologising for occupying so much of your space, I am, sir, your obedient servant,

London, October 28th, 1858. LAKE PRICE.

PHOTOGRAPHY IN ALGERIA.

NO. III.

MY DEAR SIR,—I have at last received the first number of the "PHOTOGRAPHIC NEWS," and am not a little rejoiced to find that it contains the first letter I wrote to you; and I look forward with some little eagerness for the number which may contain my second letter—I presume about No. 3 or 4. As a photographer I am, for several reasons, extremely glad to see a weekly paper devoted to photography. In the first place, by giving one an opportunity of becoming acquainted with all discoveries of any importance made on the continent as well as at home, it will save one the possible annoyance of spending hours, or even days, in making experiments which had been previously made: it will induce some thousands (it is to be hoped) of photographers to study the chemistry of the art, and thus greatly increase the possibility of new discoveries being made in it. The answers to correspondents will remove stumbling-blocks from their paths; and, what is to me personally—and doubtless to all other old photographers—a matter of no small importance, is the reflection that I need not in future compel myself to read foreign photographic publications, seeing that the "NEWS" will keep me *au courant* as to what is stirring on the continent. . . . .

I have not yet been up to the tents, as I informed you was my intention in my last letter, for a reason I am

about to explain. Shortly after I had returned from the Post-office I received a visit from Sheikh Hamed, who proposed that, instead of going at once to his douar, I should accompany himself and brother in an expedition against a mountain tribe that had recently made several attacks on the Arabs living under French protection. His brother was an officer of the *Spahis Indigenes*, who were selected to form part of the expedition, and had directed him to say that there would be no difficulty in finding means of conveying whatever instruments I might require for photographic purposes. The proposition was, as the sheikh said, *séduisante*. It would, possibly, give me an opportunity of getting some interesting pictures, and was certain to enable me to get some information which would be interesting to your readers generally, and especially to those among them who may happen to come out here; consequently I accepted his invitation. The next thing to be considered was, how I could best succeed in obtaining some good pictures. The most convenient would have been the dry collodion process; but as this had failed me on more than one important occasion, I was reluctant to employ it where a failure could not be remedied. Considering the interest felt on the subject of dry collodion, both in France and England, when I left home, I may be excused if I offer a few remarks relative to my own experience with this process since I have been here. The collodion I have been using was purchased in London, half a dozen bottles of which I brought with me from England. Living in a city I have not found it necessary to test the length of time during which this collodion would preserve its sensibility, my usual practice being to prepare the plate or paper overnight, which I do in the following manner as regards the paper:—I lay the sheet of paper on a table and rub it rapidly, though lightly, with a piece of india rubber until the paper is quite warm—in fact, is highly charged with electricity; I then support it on a piece of glass, pour on the collodion, and allow it to spread itself smoothly over the surface; then sensitise and wash it well in several waters, and when dry, cover it with a weak solution of gelatine. In this way I have prepared papers 14 × 12, upon which I have generally obtained good pictures. There are two lying on my table at this moment—one a view of the port of Algiers, and the other a view of the suburbs of the city—which could not, in my opinion, be excelled. I had my tent with me when I took the latter, and before exposing the paper I wetted its surface with a little water, and while still moist I placed it in the camera; the result was, as I anticipated, the rapidity of the action was much increased, and the picture, when developed, appeared more dense. The conclusions I drew from this experiment were, that it was advisable to use the collodionised paper as soon as possible after preparation, though not absolutely essential; or, in the event of keeping it for any time, some method of softening the sensitive surface previous to exposure would render the result more favourable. To test this I adopted the following plan:—I prepared some sheets of paper and put them aside for about three weeks, at the end of which time I brought them out and laid a very thin sheet of damp blotting paper on the sensitive surface of each, and then packed them in my portfolio in such a way that the blotting paper was in contact with blotting paper, and in no case with the back of the prepared paper. I found this method greatly increased the rapidity of the action of the light upon the sensitised surface, and I generally succeeded in getting good pictures by this process, which I do not doubt could be improved; indeed I propose, if opportunity serves, to moisten the blotting paper with a weak solution of some substance which I hope will act as a stimulant to the dry collodion, and thus render its effects more certain. Especial care must be taken that the blotting paper does not contain too much moisture, or it will have the effect of dissolving the gelatine and rendering the surface of the collodion rough and uneven, if it does not damage it still more.

To return to my journey. I was determined to take with me the means of obtaining pictures; and though the dry collodion offered great facilities, I eventually decided on sticking to the wet collodion, though it involved the possibility of not getting any pictures at all: for rapidity of movement being the great thing in these expeditions, it was to be feared that, owing to the limited number of baggage animals taken, my camera might be in one place, and my tent where it could not be found. It was necessary, however, to risk this, so I packed up my apparatus and sent it to the sheikh, taking care to follow it myself and see it packed, for to have done otherwise would have been to have acted with as little consideration as a negro here, of whom it is said that, being told to saw off a bough of a tree, he sat himself on the branch and sawed away at it, between himself and the tree, until he and it came to the ground together; upon which he uttered an exclamation in a tone of the deepest surprise, which being interpreted (very freely) signifies, "By golly, massa, who'd tought him come off boff ends at once?"

. . . . There was a faint glimpse of dawn when the soldiers began to assemble, yet, so complete were the preparations, that the sun had risen but a very little way when they commenced their march. It felt quite cool and pleasant in the early morning, and so pure was the atmosphere that we could see an immense distance across the desert. The mere motion in it excited a feeling of exhilaration to which I had long been a stranger. After marching about five hours we halted beside a well, around which a great many Arabs resided, of whom we got milk and a kind of cake very much resembling what in the "far west" is termed damper. A very few years ago these Arabs were bitter enemies of the French, whereas now they appeared to be without the smallest animosity against them; and certainly if the French have made themselves their masters, they have done more for them than they, the Arabs, could possibly have done for themselves. The artesian well, around which we halted, was the work of French engineers, and to the water from this well was entirely owing the fertility which the desert around it exhibited, and the dwellings that were so thickly scattered about, where a few months before there had stood perhaps not more than one or two tents. None but those who have spent days in the desert traversing hot sands which scorch even the bare thick-soled feet of the Arab, who can journey along the roughest mountain road without danger of cutting them, can fully appreciate the blessing of an abundance of water; therefore the Arabs, who are not utterly ungrateful for good done them, are becoming more and more reconciled to the rule of their conquerors. The opportunity of getting one or two photographs of the halt was not to be neglected now that there was an abundant supply of water, so, with the assistance of my friend, the sheikh, I pitched my tent and took a couple of views, one of the troops, and another of the village. An amusing circumstance occurred here illustrative of the coolness of Arab thieves. A Zouave had taken off his baggy trousers to make some necessary reparation, and while in the act of plying his needle he was called by one of his comrades to come and take his coffee. The trousers were thrown aside for the moment, and the Zouave employed himself actively in discussing his breakfast, which occupation so entirely absorbed his attention that he was unaware of the proceedings of a native, who had quietly crept to the trousers and was making off with them, when a shout was raised by a Zouave who had observed his motions. Of course he was immediately seized and taken, with the stolen goods in his possession, before the provost, who at once ordered him a flogging; the sentence was no sooner interpreted to him than the fellow, to the great amusement of all present, coolly said, "I suppose, Mr. Judge, I may keep the trousers." By the time this little affair had been settled the troops were again under march, and did not halt for three hours, and then only for about an hour, when they resumed their march for three hours more. In the desert it is the practice, as far as possible, to regulate the marches so that the halt for the night may be near a well; but this is only when

there is no especial hurry for a day or two, which was the case with us, inasmuch as we were marching against a tribe in the mountains whom we were certain to find there when we arrived. Had we been directed against a tribe encamped in the plain, we should have pushed on at a much greater rate, because if we had not "dropped on them," as M. —— expresses it, like a thunderbolt, they would have sent away their flocks and cattle, even if they had stayed themselves for a fight; and, under these circumstances, the number of hours which the troops march is surprising. A Zouave told me that he had formed one of an expedition which marched forty hours out of the forty-eight, and at the end of that time attacked the tribe of which they were in search, and captured every animal they possessed, and utterly routed them. It is a pretty sight to see the groups of soldiers scattered about at the bivouac, and the contrasts of colour in the red, baggy inexpressibles of the Zouaves, and the white burnouses of the Spahis, was as pleasing to the eye as anything I ever saw; and it was with no little regret that I was obliged to content myself with reproducing the *form only* for my friends in England, without being able to communicate to them a part of the pleasure I myself derived from *colour*. As it grew dusk fires made themselves gradually visible, and by their flickering light one could see here and there a man sewing up a hole in his clothes, or repairing his shoes; but the greater portion of them were lying down smoking, chatting, and making a tremendous hubbub. The contrast between the Spahis and the Zouaves was striking. The Arabs were sitting about in groups, grave, and for the most part, silent. All of them were smoking, and here and there one of them was holding forth respecting the chances of plunder which the expedition offered—a matter in which they feel a far keener interest, I believe, than in the credit of the government they are hired to defend. I don't mean to imply that they are indifferent to the pleasure of cutting a fellow-countryman's throat, for I certainly think they do that with as much gusto as any Zouave who has seen his comrade shot down beside him, but they have an ever-craving appetite for plunder which can never be appeased; an appetite strengthened by the kind of warfare in which they have been trained. It may perhaps appear to your readers that these Spahis are mere hired bravoes who are enlisted by the French Government to fight against their countrymen, but this is not the case; these Arabs belong to tribes which are principally resident in the neighbourhood of the towns, whereas the tribe against which they are generally led by the French is that of the Kabyles, an independent-spirited, courageous race, who mostly inhabit the mountains, and are a terror to Morocco on the one hand, and a pest to the French rule on the other; but before many years are past France will be able to say, with Sganarelle, "*Il etait autrefois comme ça, mais nous avons changé tout cela.*"

[In consequence of the length to which our correspondent's letter extends, we must defer the publication of the remainder until a succeeding number.—Ed.]

NOTES FOR ALPINE PHOTOGRAPHERS.*

Before going further I must say a few words about our baggage. In addition to our cameras and stands, and prepared plates, we had, of course, our carpet bags. My camera is what is called a tourist's camera, made by a good maker, very handsomely got up, very expensive, and, for its size, very heavy. This latter was not of so much consequence to me on this excursion, as I was not *verdant* enough to carry all my baggage myself; but I confess to feeling sundry qualms of conscience when I saw our "porteurs" sinking continually in the snow while we were crossing the pass of St. Théodule. It is quite necessary, whether the amateur carries his own camera or not, to reduce to the smallest possible weight all the metal and wood-work therein. All the complication of parallel rulers with their screws, can very well be dispensed with. My companion, Major de R——, a distinguished Russian officer, had the happy idea of carrying his small French camera, and all the rest of his baggage, in a light basket in which the peasants in this canton (Vaud) carry almost everything—fruit, vegetables, bread, meat, and even manure. They call this useful contrivance for their back a "hotte," answering to our word "hod." We perceived that after we left this canton, this "hotte" was everywhere an object of curiosity; and on the other side of the Alps, it was looked upon with the greatest astonishment, if not suspicion. At all events it proved a very useful packing case—doing away with the necessity of any other—easily carried on a man's or mule's back, and though containing a lot of bottles, for my friend purposed developing some paper negatives each night (which, by-the-bye, he did not), it did not weigh so much as my baggage.

We had never been at Zermatt; and as every guide book, and almost every traveller, tells you that it is *the thing* in Switzerland, and far superior to Chamouni (though I don't agree with them), we determined to bend our steps that way. Now, "though on pleasure bent, we had a frugal mind;" and we, therefore, resolved to do a considerable portion of the journey on foot, hiring a mule to carry our baggage. Our walking, however, did not commence until we reached the dirty, poverty-stricken little town—if town it can be called—of Viège or Visp, in the Canton du Valais. This same Visp still bears lamentable traces of what it suffered from the earthquake which played such havoc with this part of the Valais in the autumn of 1855.

Our starting place was Lausanne, the town and neighbourhood of which afford great scope for the camera. Indeed, I know but few places so rich in picturesque bits. Major de R——, as well as myself, had been residing here some time, and we had together rambled about in search of the picturesque. Probably a note or two of the things to be taken here may not be amiss. The handsome cathedral of Notre Dame is a very attractive object, as seen from various parts of the town. It was founded about the year 1000. It is finely situated on rising ground in the centre of what is called the "cité," and commands an extensive view over the lake and surrounding country. A remarkably beautiful view of it can be taken from the Berne road, another from the delightful promenade of Montbenon: in the foreground are some of the arches of the "Grand Pont," a handsome modern viaduct connecting two portions of the town. In the extreme distance you have a south-west view of the cathedral, with its handsome towers, and the middle distance is filled up with quaint-looking spires, houses, and public buildings. Like our English cathedrals, that of Lausanne is so hemmed in by buildings that it is difficult to obtain with the camera many of its details. It is, however, just possible to get a view of the South Porch, or "Porch of the Apostles," so called on account of the carved figures therein; and a very charming thing it is. You will see, by the little photograph I inclose, that it is not easy to obtain a correct view of it. You will see, also, that it is well worth taking, even if you are compelled to raise the nose of your camera high enough to throw the lines out of the perpendicular. It should be taken on a sunless day; the buildings near it throw such a shade over a portion of it all the day. There is a fine rose window in the south transept, but too high to be obtained unless it is possible to take it from the top of a house just built, I regret to say, within a few yards of it. The west doorway is very fine—the door itself, abominable.

The château not far from Notre Dame offers one or two good points of view. The "Place de Palud" contains a nice old fountain, well worth taking; also the Hotel de Ville. A fine view of the cathedral from the Place de Riponne, should be taken in the afternoon because of the light.

The church of St. François has two or three good points for a photograph, especially the apse and spire as seen from the promenade near the Hotel "Belle Vue."

* Continued from page 89.

For those persons who are staying at Lausanne a few days, there are plenty of short excursions to be made, by the railway and boat, to places abounding in excellent subjects for their portfolio. Half an hour by boat or rail takes you to Moyes, a little town on the shore of the lake; from thence a pleasant walk of two miles brings you to the noble château of Wufflens, in ancient deeds Wolfiens or Wonfiens-castrum. Popular tradition asserts that this magnificent castle was built by good Queen Berthe, wife of Rodolph the Second, King of Burgundy, between 921 and 962; and tradition likewise asserts that the bricks, of which this enormous pile is composed, were cemented together with mortar mixed with wine instead of water: however this may be, the mortar is remarkably hard, much harder than the bricks. According to the most probable accounts, the castle dates as far back as the time of the crusades, the twelfth century; and judging from the curious subterranean vaults under the château, it is most likely that the present structure was built on the ruins of one much more ancient. S.

(*To be continued.*)

THE PHOTOGRAPHIC SOCIETY.

On Tuesday evening last the Photographic Society held its first monthly meeting of the season at the Coventry-street Rooms. We were glad to see such a goodly attendance of members; and if we may judge by appearances, we should say that the forthcoming series of meetings may prove very interesting and instructive. Mr. Fox Talbot had sent several specimens of his new photoglyphic engravings, which were examined with great interest by the members present, who commented freely upon the present achievements, and the probable future success of this great discovery. Mr. J. D. Llewelyn had also contributed a complete set of those charming pictures which he has already exhibited. We need only mention this fact to call to the mind of the reader those very beautiful specimens of the oxymel process—a process by which no one but Mr. Llewelyn can produce such results as are here presented. Beautifully and clearly developed as the exhibited specimens were, we are almost inclined to think, that those at the Society's Rooms are still more beautiful. There was also a set of photographs exhibited by Mr. Sturroch, some of which were remarkable for the delicacy with which the detail was rendered; this was especially the case with some fine architectural views which, for beauty and clearness, we have not seen surpassed, while others were but very inferior; indeed, there are among these some that may be denominated the best, while, on the other hand, there are some that may be denominated the worst we have seen. There was also a specimen of, what we have on other occasions designated, "patched" pictures. Considering what has already been done in this department by Mr. Henry P. Robinson and Mr. O. G. Rejlander, we are really astonished at anybody having the temerity to exhibit a picture which has not a single claim to the attention of even the merest tyro in the photographic art. There are no grounds upon which we can recommend it, either artistic or photographic. It is not a picture representing an incident or a sentiment, but simply a family group, certainly not grouped in a manner that reflects much credit on the composer. The novelty which, we presume, the composer thinks he is presenting to the professors and students of the heliographic art is, that the picture is composed of several negatives. But what shall we say of the manner in which the joinings are effected? They certainly are novel. The wonder of such pictures as Mr. Rejlander composes is, that he disposes the light and shade over his compositions so that the spectator is unable to discover the joinings; but, in the instance before us, we have every negative plainly indicated, not only at the places of junction, but also in the colour of the several negatives—one being light whilst another is dark. The first or second joining is just passable; but as we approach the middle, the whole composition is nicely varied by a crooked line of white here and there intervening, sometimes a quarter of an inch wide, while a buffet or footstool is pleasantly situated in the middle of the picture, reminding one forcibly of the geographical description of an island, which is "a piece of land surrounded by water"—while the footstool we allude to is a black mass surrounded by a white fringe. Our object in thus alluding to a worthless picture is, to warn photographers from sending such silly things for inspection at a meeting of the London Photographic Society, where one expects to see, not the simple, first attempts of novices in the art, but the results of processes or some of the multiform adaptations of photography. There were also some specimens of Poitevin's process of photo-lithography exhibited by Mr. Malone, which had been brought for the purpose of comparing them with those of Mr. Fox Talbot. These photo-lithographs were, for the most part, copies of patterns and portions of fine architectural buildings. It could not fail to be seen, even by the most unobservant, that these specimens were indeed beautiful; yet it is unfair to bring them into comparison with the productions of Mr. Talbot, inasmuch as that gentleman's views are almost exclusively landscapes, or views of whole buildings, in which it is much more difficult to attain anything like perfection. While the views by M. Poitevin were selected so as to show to the best effect what that gentleman can do, in the case of Mr. Talbot the reverse seems to be the case. However, the subject will be treated more at length, as a paper—or, at least, a discussion—has been promised on new processes which have been invented to supersede the engraver. Mr. Delamotte exhibited a large view of the Crystal Palace, which was remarkable for its large size, the beauty of its half-tints, and the nicety with which the detail was rendered. When we visited the Crystal Palace recently, we recollect seeing some photographs—or at least what *were* photographs—of the same subject, if we mistake not, by the same gentleman; and, as far as relates to the correctness with which they represented the sentiment which Mr. Robinson has so ably illustrated in another way, we think that they were still more successful, for they bore the most unmistakable and decided evidence that they were "Fading Away," a fate which we hope will not overtake the specimen above alluded to.

Owing to the absence of the Lord Chief Baron, Mr. Roger Fenton occupied the chair. A paper was read by Mr. Reeves Traer, M.R.C.S., on "The Photographic Delineation of Microscopic Objects;" after which there was a discussion, which lasted until ten o'clock. We refer our readers to another column for a full report of the proceedings of the meeting, and the discussion which took place after the reading of the paper was terminated.

Photographic Chemistry.

NATURE OF THE METALS.

(*Continued.*)

Potassium is a metal of a silvery colour when freshly cut, but which speedily becomes tarnished if exposed to the air. It is therefore necessary to preserve it below naphtha if it is desired to keep it free from change. At ordinary temperatures it is so soft that it may be moulded with the fingers; but when cooled to the freezing point, it becomes brittle; it melts at 150°, and is vaporised at a heat a little below redness. Its affinity for oxygen is so great, that a piece of this metal thrown into a basin of cold water decomposes the water with such rapidity, that the liberated hydrogen ignites, burning with a beautiful red and white flame, which continues so long as there is a particle of the metal floating on the surface of the water, which, when the flame is extinguished, will be alkaline. It combines with oxygen, forming protoxide and peroxide. The protoxide, or potassa, is formed when thrown into water; the peroxide, when

the metal is burnt in oxygen: it is also that which remains when nitre has been heated until totally decomposed. If this metal be heated with sulphur or phosphorus, it combines with those substances with brilliant combustion, and forms a sulphuret or phosphuret of potassium. To form the chloride a piece of the metal may be introduced into a jar of chlorine, when it immediately bursts into a brilliant flame. It absorbs cyanogen gas, becomes red hot, and forms cyanide of potassium. Potassa is formed by a combination of one equivalent of this metal and one of oxygen. A small quantity of this substance added to the iodide bath is said to give rapidity to the negative proofs: it is also occasionally employed in varying the tones of positive proofs after they have been submitted to the hyposulphite baths. A solution of common potash is very useful for cleaning glass plates.

Sodium is a metal in many respects like the preceding; it is silvery in appearance, tarnishes in the air, and, to preserve it without change, it should be kept under naphtha, that liquid containing no oxygen. It is rather less violent in its action than potassium when thrown upon water, it does not burst into flame, but effervesces violently, and the water is changed into a solution of soda. It combines with oxygen to form protoxide or *soda* and peroxide. It combines with sulphur and phosphorus under the same circumstances as potassium. If introduced into chlorine it burns, and the resulting substance is chloride of sodium, or common salt; formed of 1 equivalent of chlorine with 1 equivalent of sodium. This is sometimes used in the preparation of positive papers; but, as the salt of commerce, especially if it contains magnesian salts, deliquesces on contact with moist air, it is preferable to use chloride of ammonium: it may also be used as a substitute for bromide of potassium for temporarily fixing negative proofs; also, for precipitating residues containing nitrate of silver, which it accomplishes by transforming the nitrate into an insoluble chloride of silver, from which the silver may subsequently be obtained in a metallic state.

Calcium is a metal contained in lime. It can only be obtained with great difficulty, and it is therefore rarely seen. Lime is an oxide of calcium, and is composed of one equivalent of oxygen to one equivalent of calcium; there is also a peroxide which contains double the amount of oxygen found in the oxide. If this oxide be exposed to the action of chlorine, it is decomposed—the chlorine being absorbed, and a compound formed, which is called chloride of lime. The oxide of calcium or—to use the more familiar term—lime, is best prepared for photographic purposes by intensely heating white marble so as to expel the carbonic acid. A piece of the result held under water as long as it continues to give off bubbles, and then withdrawn and laid on a saucer until it bursts and falls into a fine powder, is, when cold, fit for use, and may be employed in preparing the bromide of lime and other salts. Calcium combines with chlorine, bromine, and iodine, forming well-known salts.

Magnesium is a metal of little utility in itself, and probably few of our readers have seen it in its metallic state, though they have, doubtless, at some period of their lives, been made familiar with it in its combination with oxygen—a form in which it is generally known as magnesia. At one time, the chief source from whence this oxide was derived was from the sea; but it is now obtained in unlimited quantities from magnesian limestone, a mineral composed of carbonic acid, lime, and magnesia, by the action of heat. Under this action it gives out a bright phosphoric light; and a very pretty effect is produced by placing some of the magnesia, thus ignited, in a saucer, and while still warm, pouring round the edges a little strong sulphuric acid, when, if in a dark room, bright flashes of light are emitted from it, accompanied with a hissing noise. The chloride of magnesium is formed by heating a mixture of carbon and magnesia strongly in chlorine, when the latter drives out the oxygen and takes its place. Magnesium may be obtained by passing the vapour of potassium over ignited chloride of magnesium.

(To be continued.)

Dictionary of Photography.

Acetate of Silver.—This salt is obtained by mixing together tolerably strong aqueous solutions of nitrate of silver and acetate of potassa or soda. It falls down in the form of white silky crystals, which, to be obtained pure, must be filtered, washed with a little cold distilled water, then redissolved in hot water, filtered, and allowed to crystallise on cooling. The crystals are tolerably soluble in hot water, but require about 100 times their weight of cold water to dissolve them.

The following interesting experiment is recorded by Mr. Hunt, in his researches on light:—"Two phials were filled with a solution of acetate of silver, and carefully corked; one was exposed for an hour to good sunshine, whilst the other was carefully kept in the dark. At the end of this time, a solution of protosulphate of iron having been made in the dark, 10 drops of it were added to each solution of silver. The one which had been exposed gave *immediately* a copious precipitate of silver, whereas the other was only rendered slightly turbid, and was some minutes before it precipitated. After having stood eight or ten minutes, no difference could be detected in the quantity of silver precipitated in either phial. Acetate of mercury was used in the place of the acetate of silver, and the difference between the actinised solution and the other, on the addition of the iron salt, was very striking.

"The two salts, acetates of silver and mercury, were mixed. One portion was exposed in a large test tube carefully corked, and another portion was protected from all light in a bottle. The exposure in this case was from two to three hours, but during that time there was not more than half an hour's good sunshine. By the light of a taper an equal quantity of sulphate of iron was added to each. In about three minutes the solution which had been exposed appeared a little disturbed, small specks were seen to form in various parts of the fluid, and these rapidly increasing in size, and assuming star-like shapes, fell heavily. At the expiration of an hour a dark and bulky precipitation was formed; but in the unexposed solution the precipitate was but in small quantity, and of a light gray colour. In about two or three hours a coating of white metal was formed, in two well-defined stripes, along the tube which had been exposed to solar influence; one on the side directly facing the sun, and the other on the other side of the tube, but along a line upon which I found, by subsequent experiment, the rays were concentrated by the form and refractive power of the media—glass and metallic solution—through which they had to pass. That these lines were due to the action of the solar rays, was proved by placing a piece of blackened paper around a tube during exposure, which effectually prevented the metallic deposit over the space it covered."

Acetic Ether,—is formed by mixing 6 parts of alcohol, 4 of glacial acetic acid, and 1 part of oil of vitriol, and distilling until a little more than half has come over; the distillate is then washed twice with its own bulk of water, and rectified with chloride of calcium. It has an agreeable odour, resembling that

of apples, and is a good solvent for pyroxyline; depositing the latter, however, in an opaque powdery condition, instead of transparent as ordinary ether does.

ACETO-NITRATE OF SILVER is a term used in the talbotype or calotype process, for the mixture of glacial acetic acid and nitrate of silver solution with which the iodised paper is excited. Mr. Talbot's formula (which we do not think has been improved) is a 50 grain solution of nitrate of silver, to which is added one-sixth part of its volume of glacial acetic acid.

(*To be continued.*)

A Catechism of Photography.

VI.—THE OPERATING ROOM.

Q. WHAT sort of room is necessary for the taking of photographic portraits?

A. It is necessary to have a strong light, and it is usual to have the room fitted with a glass roof, one or two of the sides being of glass also.

Q. Is it not possible to have too much light?

A. Certainly it is; for under such circumstances the photographic effect is too rapid, and favourable pictures are seldom procured. The light should be modified by blinds, which are made to draw over the glass roof.

Q. Cannot portraits be taken in the open air?

A. They can; but there are obvious advantages in having a proper operating room.

Q. How are operations to be conducted in the taking of landscapes?

A. These operations are almost invariably conducted in the open air. It is best to be provided with a landscape camera, a proper camera stand, and a convenient box for holding the sensitive plates previously prepared. Apparatus especially adapted for field operations may be procured at any ordinary photographic depôt.

Q. What is chiefly necessary for the operator to remember in taking out-door views?

A. He should spare no pains in selecting, for a desired view, the most favourable hour of the day—such an hour as will give the lights and shadows of his subject in the happiest and most characteristic disposition. The operator has to bear in mind that his picture will be in *light and shadow only*. He should carefully select, and not too hastily, the best point of view.

Q. What is necessary in the arrangement of the camera?

A. It is obvious that the camera should not face the sun; not only because diffused light may thereby enter the lens, to the injury of the sensitive plate, but a little observation will show the disadvantage of having the shaded sides of all objects fronting you in the picture.

Q. What is the next thing to be done after selecting the point of view?

A. Firmly to plant the camera stand; level the plate on which the camera rests; and fasten the camera in the desired position. Select some prominent object in the centre of the field, and in middle distance, and, with the open lens, the diaphragm being removed, adjust the focus upon this object as sharply as possible. Upon replacing the diaphragm, with half-inch aperture, you will find all the other objects in the field are brought into the same focus. Lastly, adjust your view on the screen of the camera by turning it slightly to the right or left, and giving the desired portion of the sky and foreground.

Q. What should be the extent of the aperture of the lens?

A. Different opinions are entertained; but it is generally agreed that a half-inch aperture to the lens is the largest that should be used for a landscape of any depth.

Q. What is the most favourable light for procuring a successful picture?

A. The most favourable light is, unquestionably, that given under passing clouds. By closing the camera when necessary, and reopening it, thus giving a due proportion of sunlight, and the diffused light through the cloud, the happiest results may be attained.

(*To be continued.*)

Correspondence.

FOTHERGILL'S PROCESS.

DEAR SIR,—Your request for information respecting the process of Mr. Fothergill from those who have worked it successfully will, I have no doubt, evoke such an inundation of correspondence, as will render your duty of selection and arrangement somewhat onerous: you can deal, therefore, with the few hints I send for your perusal as you think proper—either working them up, with other materials, for the benefit of your numerous readers, or excluding them for others which may be clearer and more concise.

By the courtesy of Mr. Keene, of Leamington, I was enabled to report upon the success of my own trials of this process at a meeting of the Birmingham Photographic Society, held several days before its discovery was announced in the *Times*. My success has been constant and uniform, and the resulting negatives *fully equal* to any I have obtained, either by the process of Taupenot, or Dr. Hill Norris; and those who are at all acquainted with these processes will perceive, that this is no slight recommendation. It is, in fact, the simplest and most certain of all the dry processes at present known; and, with ordinary negative collodion, and a silver bath of 35 grains to the ounce—either neutral or slightly acid, it matters but little which—the slightest skill and caution in the manipulation must insure a good picture. There is no difference in the results obtained either by a neutral or a slightly acid bath; the only thing affected is, the *sensitiveness* of the plates, and this is not seriously impaired so long as the argentine solution merely shows a *faint* acid reaction upon test paper. A bath, in fact, which will answer for negative portraiture will suffice for this process; and collodion, either *contractile* or *porous*, may be used indifferently, only taking especial care, if the former be employed, to render it adherent to the glass, by making the latter scrupulously clean. My mode of cleansing the plates is this:—I mix one part of nitric acid with two parts of distilled water in a stoppered phial; in another bottle with a wide neck, and a piece of fine muslin tied over it, I have a quantity of finely-powdered tripoli: a small quantity of the latter is sifted on the surface of the glass, to which a few drops of the former are added; the brisk application of a tuft of clean cotton in a couple of minutes or so soon removes all injurious matter; and a thorough rinsing in common water completes the operation. A chemically clean cloth is necessary; (I invariably use an old towel, which has been washed in *hot*, and then rinsed out in *cold, rain water*, carefully *eschewing all alkaline* solutions;) and, for want of care in this stage of the collodion process, many a clean plate is defiled, and much annoyance created. When the plate is wiped dry, I hold it before the fire for a couple of minutes to dissipate all adherent moisture; and, when cool, I rub it briskly for a few seconds with a dry silk handkerchief. These operations I never perform in the room in which I coat and sensitise the plates. Holding the plate by means of a globe-holder, attached by atmospheric pressure to the back, pour on the collodion in the usual way; and when it has *well set*, without any appearance of desiccation at the upper corners, immerse it in the bath, where it remains until the solution runs off, on raising the plate perpendicularly, without streaks; then drain for a minute; and drawing the glass dipper along the back to remove all adherent

drops of the sensitising solution, place the plate, face upwards, in a flat glass bath, and pour very gently at one corner (for a stereo. sized plate) two ounces of distilled water, which move, with a gentle wave-like motion, over the plate for a minute and a half. It is then to be taken out of the bath; the back wiped with blotting paper; the globe holder applied as before; and the surface to be covered, *for a minute*, with a solution of albumen and water in equal proportions, which (with the addition of ten minims of the strongest *liquor ammoniæ* to the ounce of the mixed solutions) has been well frothed up, and afterwards filtered through a piece of sponge slightly pushed into the neck of an ordinary funnel. When the albumen has remained on the surface a minute, pour it off; drain for a quarter of a minute; then raise the plate to the horizontal position, with the holder still attached, and pour on gently, to the corner opposite to that from which the albumen has dropped, as much distilled water as the plate will hold; and after moving it backwards, with a wave-like motion, half a dozen times, pour it off at the opposite corner; repeat this operation at each corner in succession; then, resting that from which the *water has been last poured* on a piece of blotting paper three or four times doubled, and wiping the back, set it up to dry—if required for immediate use, against a tin vessel, the outside of which has been painted with a dead black colour to increase its radiation; or, if prepared over-night for use the next day, it will dry in about three hours spontaneously. The exposure, in good light at this time of the year, will be, with a stereo. lens 4½ inches focus, about 1½ or 2 minutes. Develop (attaching the holder as before, and first moistening the collodion surface with distilled water) with

Pyrogallic acid	1½ grains.
Glacial acetic acid	10 minims.
Distilled water	1 ounce.

The development must not be pushed too far, as the colour of the deposit is very impervious to the actinic rays.

Yours very faithfully, W. L.

To the Editor of "The Photographic News."

Sir,—Observing that a correspondent, in your last number, speaks in depreciating terms of Marion's paper, I think it but justice to say that I have used it for a period of more than five years, with universal success; and have also frequently printed excellent pictures upon it, when described by amateurs as "spotty" and "bad," without any trace of such fault.

I inclose for your inspection a photograph upon their paper, printed a day or two ago, in London, with an eastward fog: and will only add that I believe most of the complaints made against paper, generally belong to the silver or hypo. bath. Herbert Watkins.

Photographic Societies.

Photographic Society — Ordinary General Meeting, *2nd November*, 1858.—R. Fenton, Esq., in the chair.

After some official business, Mr. Reeves Traer, M.R.C.S., &c., read a paper "On the Photographic Delineation of Microscopic Objects," as follows:—

"The application of the photographic art, to which the following remarks more particularly apply, is one of the most beautiful and interesting with which its followers are acquainted.

"Thanks to the modern popularisation of science, most people now know that, in each humble plant that thrives in every hedge, there exists a diversity of beautiful, minute structure, an examination of which prompts the mind to venerate, as well as to admire; while every insect—indeed, the whole of animate creation—teems with marvels for the student's eye, which show him how wondrously the Creator's power has arranged and ordered all portions of each economy, whether of high or of low type, so that its intended functions shall best be carried on.

"To delineate, with the accuracy of photography, some of these beautiful structures, must surely be both interesting and instructive; and I regret that I have not had opportunities lately of preparing more numerous specimens for your inspection, but I trust that the few which I shall have the pleasure of laying before you will be sufficient to illustrate my remarks, and to prove how easy it is to obtain magnified representations of microscopic objects.

"The first difficulty I met with was caused by my attempts to adapt the body of my microscope to a camera. I had read of successes obtained by means of blackened tubes and, of course, tried that method, but must confess that I found it both inconvenient and unmanageable. Finally, when in Paris, I had some conversation with M. Nachet, the intelligent microscope maker of that city, and the result was that he made from my description the instrument I have ever since used, and which has thoroughly fulfilled the purpose for which it was intended.

"The chief point to be attended to in the construction of such an instrument is, to adapt the essential portions of a microscope to a camera, viz., the object-glass, the stage, the mirror, and an adjustment. These are so arranged in the apparatus which I use, that the whole screws bodily in the camera, and thus becomes entirely under control.

"The first of these essential elements—the object-glass—requires some consideration. I would advise any person about to purchase one to go at once to a good maker. He will have to pay a good price first; but as the whole success of his microscopic study depends upon the excellence of the "glasses" he uses, I am inclined to think that no one will regret the expense, seeing that he will most likely possess as good an article as modern intelligence can produce. Of the stage little need be said, except that it should be of sufficient size, firm, and furnished (if intended to assume a perpendicular position) with a "spring clip," or some other contrivance which will hold firmly the slip of glass on which the object is mounted. I am of opinion, that what are called "stage movements" are expensive luxuries, and not essential to the instrument; for with a little practice the hands will soon be found to be thoroughly educated, and capable of moving the object with the greatest delicacy. I found that the mirror originally adapted by M. Nachet was too small, and I now use one of 2¼ inches diameter. Two adjustments, a coarse and a fine, will generally be found to be necessary; the former for focussing when using the lower powers, and the latter when the higher are employed. The milled head belonging to the fine adjustment may be marked with a certain number of divisions, to enable the photographer accurately to give it any portion of a rotation that he may find necessary, should the chemical and visual foci of his object-glass not correspond. There is also an arrangement on the under side of the stage which enables me to fix an inverted object-glass in the track of the rays of light, and thus condense them on the object itself.

"I will now explain, as briefly as possible, the *modus operandi* I adopt, and from that description you will, I hope, fully understand the applicability of the apparatus I have described. Not having a "glass room" at my command, I operate in the open air, and commence by placing my camera on a firm table in the sun, so that its long axis is identical with the sun's rays, taking care to throw a light coloured cloth over it to protect it, as much as possible, from the heat. The mirror is now placed at such a distance from the object-glass as to equally illuminate the field, which, if using the concave side, I found was best done by allowing a space, slightly greater than its focal length, to intervene between it and its object, so that the rays should enter the instrument just after they have commenced to disperse; otherwise, if the object was in the focus of the mirror, I observed a bright white spot occupying a portion of the field, which quite destroyed the picture. I fancy this was caused by an image of the sun being formed nearly on the same plane as the object, and thus becoming represented on the ground glass; at any rate, I never am now troubled with this difficulty, provided I place the mirror as I have described.

"If the object-glass be a quarter-inch, or a higher power, I always use the concave mirror, and employ an object-glass of power next below that with which I intend to photograph, as a condenser. The mirror should now be arranged so as to give a circular field, and when this is *evenly* illuminated, the object may be placed in position, the proper focus found, and then all is ready for the sensitive plate. Should a very large repre-

sentation be wished, and the operator does not regret a slight loss of definition, he may place a high eye piece in the brass tube, from the inside of the camera. The large photograph of the '*Acarus*' parasite of the dry *locopa violacea* was taken under these circumstances.

"Photographic manipulation so practised by me presents nothing peculiar; indeed, it is that usually adopted in the collodion process. I need not, therefore, enter into its description, but a few remarks on the causes of failures I have met with will, perhaps, be interesting.

"The first that I had to encounter was the white spot, of which and its cure I have already spoken. The next was induced by the fact, that in object-glasses of lower power than ¼ of an inch, the foci of the chemical and visual rays do not correspond, from their being slightly over-corrected for colour; the chemical focus is separated slightly from the visual, and hence the glass must be moved a little away from the object.

"Judging from the recorded experience of others, I must be very fortunate in my glasses, for this focal difference is very slight even in the lowest powers. In my half-inch glass the imperfection has been counteracted by the addition, at its back, of a double camera lens of about four inches focal length; and I have found out by experience how much of a circle it is necessary for me to turn my fine adjustment to succeed with the low powers.

"Another difficulty which I met with was the time of exposure —that general bane of photographers. In common with other operators, I have found that, *cæteris paribus*, the actinic power of the sun's rays varies greatly day by day and hour by hour on the same day; but with collodion iodised over night, I have taken good negatives, on a clear day, in one second, sometimes in less, while, on other occasions, I have been obliged to expose my plate for seven or even ten seconds, rarely for more—be it always understood that I am now speaking of an unclouded sun. Once or twice I have curiously enough succeeded with a short exposure late in the day, with the sun within a very few degrees of the horizon.

"It may excite the wonder of some of my hearers that I have not alluded to the photography of opaque microscopic objects. I must here plead inexperience, but I am about to institute some experiments with a view of photographing the Foraminifera. The only difficulty I anticipate is that of illumination; but I think that a proper arrangement of an oblique condenser, and a little longer exposure, will enable me to succeed.

"I may, perhaps, be allowed to mention, that the collodion I now use is of my own manufacture. I confess that motives of economy prompted me to the attempt. The pyroxyline I employ is made in Paris; and it may not be without interest to add, that I sensitise with the following combination:—

Iodide of ammonium	2½ grains.
Iodide of cadmium	1¼ grain.
Bromide of potassium	1¼ grain.
Collodion	1 ounce.

"This collodion I have found to be the most sensitive I have hitherto used; I have taken good negatives (portraits) with it in three seconds, and it gives good intensity with half tone.

"And now, gentlemen, although I have not added any new fact to photographic science, I trust I have been successful in describing an apparatus by means of which photographs of microscopic objects can easily be taken; and that, in conclusion, I may be allowed to thank you for your patient attention to the remarks I have had an opportunity of making."

After some little conversation between Mr. Harding and Mr. Traer, Mr. Shadbolt rose and said he had been for many years connected with the Microscopic Society of London, and recollected the introduction of this subject by Mr. Delves, of Tunbridge Wells. He was very glad that this subject had been brought before the Society. In the early days of photography, there was an entire misapprehension of the object of a microscopic photograph; but as the *furore* for mere details had now worn off, microscopic photography became better understood. The only difficulty in obtaining views of opaque objects was illumination. The intense white spot which Mr. Traer met with, was owing solely to the use of the concave mirror, which was unnecessary, provided a condensing apparatus was used. The usual mode of working would be by the achromatic condenser. With regard to the "stage movement," which Mr. Reeves Traer said was "an expensive luxury, and wholly unnecessary," the speaker stated, as the result of his experience, that for microscopic operations it was a *sine quâ non*. With regard to the "fine adjustment," unless it worked very smoothly, it was almost useless. (The speaker here described a fine adjustment, which was used in some astronomical telescopes; but it would be unintelligible without a diagram). With regard to the chemical focus being different from the visual, the speaker observed that he was intimately acquainted with the object-glasses of all the best makers, and it was absolutely inevitable that the chemical and visual foci should differ. In the case of the very high powers, it was not that they *do not differ*, but simply that the focal length was so small that the difference was scarcely perceptible to the eye. It would be found that if sunlight, or the light from camphine or gas were used, the amount of variation of the two foci differed with each light with the same object-glass and distance. With regard to the low powers—for an inch and a half or two inches, the amount of correction was soon ascertained for the particular light used. A correction suggested by Mr. Wenham for the low power was most ingenious, he suggested that an ordinary spectacle lens, which was, of course, under corrected, should be placed in front of the object-glass, and the variation thus corrected. (The speaker stated that he had two or three object-glasses corrected for photographic purposes in that manner.) With regard to the illumination of a microscopic object, that was a point requiring more attention than usual. With sunlight there was not much difficulty, because the rays were parallel; but his great object was to use *artificial* light for the purpose. He imagined, at first, that the more light that could be thrown on the object, the more rapid would be the action; this was found not to be the case, because, although the condensor threw a brilliant light upon the object, including as much as an angle of 90 degrees, the object glass was only adapted to take in 16 or 20 degrees, and the excess of light went to form false light in the camera. He then came to the conclusion that it would be best, in illuminating, to take a precisely opposite course close to the illuminating lamp—a small sized bull's-eye lens was placed to collect the rays of light proceeding from the flame, at a very great angle, probably 100 degrees; this was arranged at such a distance from the light that he could, by collecting as many rays as possible, fill the space of a second lens, which threw the rays nearly parallel, and the object was then placed very near to it, which made a great difference. He then found that by using, instead of that bull's-eye lens, a very small plano-convex lens of great convexity, he got another advantage. That mode of throwing the rays of light nearly parallel, or very slightly converging, would be found to illuminate the object so brilliantly and perfectly, that the amount of rapidity gained would be very great. With regard to ascertaining the amount of chemical variation, the speaker stated that an object mounted in fluid gave the simplest means of detecting it. In examining a parasite of the water rat, it was found to be studded with numerous small hairs; on focussing one of these very carefully, and then taking a picture, he could not get that hair sharp which the eye saw on the ground glass, but another nearer one, and thus, in future, on focussing for a more distant object, he could get exactly that which was required. With regard to the enlargement of the object by means of the eye-piece, of course, as Mr. Traer had remarked, nothing was gained in definition, but something of necessity must be lost; and it had another inconvenience, as it increased the convexity of the field. The speaker proceeded to say that there was another point which Mr. Traer had left without explanation—he did not communicate how he focussed his objects. If it were attempted to view objects requiring high powers, there were certain fine marks and lines which would be absolutely imperceptible upon the ground glass in the camera; and the assistance of an eye-piece would be required, in order to render them perceptible. Now the most useful adjunct the speaker could recommend, was a Ramsden's positive eye-piece. It consisted only of two plano-convex lenses, their foci being as 2 to 3, fitted with their plain sides outwards in a tube, and placed apart at such a distance, as to be equal to half the sum of their foci. The peculiar arrangement of this was, that a flat field was obtained. By means of this he could examine the image upon the ground glass of the camera, and obtain an enlargement to the amount of some 20 or 30 diameters, according to its power. A better plan than using the ground glass, the speaker said, was, to take a piece of plain glass, coat it with collodion, sensitise

wash it, and dry it, and it would present a beautiful surface, on which all the most delicate details of an object would be visible.

Mr. REEVES TRAER stated that he never found any difficulty in focussing. The glass he used was not ground, but etched with hydrofluoric acid, and he always found his object sufficiently defined on it to enable him to see with his naked eye the marks of all the objects he had produced.

Mr. GRANT, of New York, mentioned an improvement, patented by Mr. Harrison, of New York, termed the "Scroll Movement," by which the focus could be adjusted to the hundredth part of the sixteenth of an inch, without any slipping whatever. (Mr. Grant explained the mechanism by reference to a large lens adjustment.)

Mr. HUGHES stated that he was in possession of two of Mr. Harrison's lenses, which vary in their foci. He thought the coincidence of the foci was altogether an English notion.

Mr. MALONE rose and said that M. Claudet maintained that every object-glass varied with the light, and, therefore, that it was impossible to have an object-glass so corrected as to be correct in all circumstances.

Mr. SHADBOLT thought that M. Claudet was under a misapprehension, in consequence of his using a Voigtlander lens, which varies in its chemical and visual foci. He believed it to be perfectly possible to correct a lens so as to be fitted for all times and seasons.

Mr. MALONE could hardly see a probability of a lens which was corrected for white sunlight, being affected in precisely the same manner by sunlight which had passed through an absorbing medium; it was, in fact, no longer sunlight, for it had certain rays abstracted.

Mr. SHADBOLT quite agreed that the amount of correction for different sources of light, or, what amounted to the same thing for sunlight, from which some of the rays were filtered out, must be different.

Mr. MALONE said that M. Claudet found that focussing in the morning gave a certain result, but focussing in the afternoon did not give the same result. He (M. Claudet) did not attempt to define the cause, but merely suggested that the sunlight of the morning might have passed through different absorbing media.

Mr. WATSON had very frequently remarked that in the morning a lens was different to what it was in the afternoon, particularly as it got towards sunset; and if there was a tendency towards yellow, golden rays in the atmosphere, he could not get such a sharp picture as in the morning.

Mr. HUGHES said that M. Claudet was the first person who called attention to this difference in the foci. Theoretically, he thought we must take it that if the sun's rays passed through clouds, of necessity they passed through a medium which extracted some of the rays, and the same thing happened in passing through the glass of our own rooms. If this variation were sensibly and materially to interfere with our arrangements, it would render it necessary to readjust our instruments every day and hour. A great deal had been said about the difference of foci, and he believed very excellent lenses had been condemned simply because they had not agreed. He had worked (and others had done the same for many years) with lenses that did not agree. He thought it merely a question of cabinet work. Lenses that were constantly being sold as having their foci coincident, only coincided at certain distances; if those distances were exceeded, their foci varied exceedingly.

The CHAIRMAN called attention to the various specimens produced by the oxymel and by Fothergill's dry process. There were also some specimens produced by Mr. Fox Talbot's new method.

Mr. MALONE then rose and said that, in consequence of the publication of Mr. Fox Talbot's specification of the modification of his former patented process of engraving, he thought it would be interesting to bring some specimens which had the same basis to start from. They were by Poitevin, of Paris, and he thought they would bear comparison with any results which had been produced. They were photo-lithographs, produced by coating the stone with a mixture of bichromate of potassa and of gelatine, or of bichromate of potassa and white of egg. The object to be copied was then placed upon a stone so prepared, and the light acted in such a manner that afterwards, upon applying water, it should only wet the unexposed parts, as was the case upon the ordinary lithographic stone. The surface appeared to be altered in such a manner that it would receive the printer's ink, when the paper had simply to be placed upon it and be passed through the ordinary lithographic press, and thus printed without any engraving or loss of time, and have the result at once. It would be seen that this was an object that could be carried out upon a large scale. (Several specimens were here handed round by Mr. Malone.) This process had been patented in this country. It certainly seemed to be a process of very great promise. It had been suggested that the chromic acid, under the influence of the light, oxidised the gelatine in such a manner as to give rise to a resinous substance, and Dr. Frankland informed him (the speaker) that he thought a resinous substance was formed which resisted the water on the stone, but allowed the adhesion of the printer's ink.

The CHAIRMAN then read the following paper on Carbon Printing:—"The method I find quite easy is as follows:—I make a solution of gum arabic in water, about as thick as molasses; with this I grind, on a glass or in a mortar, a sufficient quantity of calcined lamp-black, ivory-black, or other pigment. When the mixture is thorough, I add, in the dark, an equal part, by measure, of a saturated solution of bichromate of potash, in honey, diluted with an equal quantity of water. The whole is now to be carefully mixed by stirring or grinding. This intimate mixture is a point of the greatest consequence. The paper I prefer is the slightly albumenised. The mixture is laid on by floating, or with a large flat brush. Dry in the dark. The printing is performed in the usual way, only using about half the time for ammonia-nitrate paper. After exposure, the print is soaked ten minutes or more in water, and then exposed under a stream of water until the whites are fully brought out." The Chairman said that he should be very glad if this matter could come before the Society upon another occasion, and suggested that the subject should be brought forward at the next meeting.

Photographic Notes and Queries.

DARK MARKS LIKE STREAKS OF MUDDY WATER ON THE NEGATIVE.

SIR,—In reply to your inquiry on the above point, in vol. i. p. 95 of the "NEWS," I believe the marks alluded to will be found to arise from the quantity of *ether* contained in the bath, from the dipping of many plates.

To avoid this inconvenience, let the bottle containing the bath be put (without its stopper) up to its neck in a jug containing *hot* water, for twenty minutes or half an hour; the ether will evaporate, and the bath then work as usual.

J. W. WHELAN.

VARNISH FOR NEGATIVES.

DEAR SIR,—Amongst the numerous useful hints which are to be found in the "NEWS," I have seen no formula for a varnish for collodion negatives at all equal to one which I am in the habit of using. The requisites for a good varnish for this purpose should be—to be sufficiently fluid for it not to give too much translucency to the negative, and thus lose vigour, and yet to be thick enough to preserve the film effectually; it should also be hard enough to bear reiterated rubbing, and should soften at a moderate temperature.

Take 100 parts of ordinary alcohol, and add 8 parts of oil of lavender and 5 of gum lac; dissolve by the aid of heat, and filter. In another bottle place 30 parts of chloroform, 5 parts of powdered amber, and about an equal quantity of broken glass to divide it: leave the mixture to digest for several days, in a warm place, shaking it occasionally, and finally decant the clear portions into a perfectly dry bottle. Take 2 parts of the alcoholic and 1 of the chloroform solution, shake them together, filter, if necessary, and the varnish is made. To use it, slightly warm the glass by a spirit lamp or fire, and when it has reached a temperature which can be just borne when the back of the glass is pressed to the lips, pour the varnish on and off, as if it were collodion, but not so rapidly, and after draining the excess into the bottle, hold the plate vertically and slightly warm it, increasing the heat as it gets dry in order to obtain lustre.

The advantages of this varnish are: it perfectly protects the film without sensibly increasing its thickness; it does not soften in the sun; it does not diminish the vigour of the negative; and finally, it so protects the surface that the negatives may be kept in a portfolio or wrapped up in paper.

SPHYNX.

COLLODION ON PAPER.

SIR,—Allow me through the medium of the "PHOTOGRAPHIC NEWS" to draw attention to a very valuable plan of taking collodion pictures on paper instead of glass. I learned it some years ago from a gentleman who communicated it to the pages of a periodical, but I cannot now lay my hand upon it. I, however, send you the plan, and recommend it to the attention of your readers. Cut a piece of fine thin paper, a trifle smaller than your glass plate. Coat the latter with collodion in the ordinary way, but before it has set, take the paper and lay it on the collodion side of the plate, taking care that no air bubbles remain underneath the paper; should any be there, they must be carefully pressed out with a thin paper knife. When this is done, recoat the whole with collodion, and proceed as in the ordinary way, allowing it, however, to remain for about double the usual time in the bath. Expose the regular time, and develop, &c., as in the collodion process, taking care to wash the hypo. off more carefully and with plenty of water, as the paper will be likely to hinder the washing. When finished, loosen the edge of the collodion, and carefully take the paper off the glass. It may be waxed, if necessary.

A great advantage of this process is the length of time the plates retain their sensitiveness. I frequently keep them four or five hours and cannot detect any deterioration.

I think if your readers would try the above plan they will not often find any necessity for any dry process, for, after all, the *first few hours* are all that it is absolutely necessary to keep a plate, except on rare occasions; added to this, the formidable accumulation of heavy glass plates is avoided, and fifty negatives can be packed up in a portfolio and stowed away in a carpet bag with no more special attention than the tourist would bestow upon a clean shirt.

ALPHA.

TO HOLD THE SENSITIVE CALOTYPE PAPER IN THE DARK SLIDE.

DEAR SIR,—I have much pleasure in forwarding the following method of holding sensitive calotype paper in the dark slide, for the benefit of your correspondent whose query on the subject is printed at page 82 of the "NEWS."

Attach three or four pin points to each inner edge of the back of the dark slide, and make corresponding holes in the margin of the frame to allow them to drop into. When the damp calotype paper is ready for insertion, draw up the sliding shutter, open the back of the dark frame, and place it over a piece of deal, cut to the size of a corresponding thickness, with the inner margin of the frame. Lay a piece of white blotting paper upon the deal, then the prepared paper cut to the size of the back shutter, and finally close. The pin points will pierce the paper, and the frame can be lifted away from the piece of deal board, when the sliding front must be shut down. It is more convenient to have the back shutter detached than hinged to the frame.* As soon as the paper has partially or entirely dried, it will be found to be held most securely in the frame, and to be stretched in its proper place without a wrinkle or crease of any kind. The image falls on the sensitive surface without the intervention of glass or the application of any adhesive substance to its edges, and, when required to be removed, can be instantly disengaged. The above mechanical contrivance I found to answer perfectly, but for some time past my ardour for talbotype experiments has vanished before the fascinations of collodion. THOMAS SEBASTIAN DAVIS.

* Of course the back shutter must be perfectly flat, and have no projecting spring in its centre.—ED.

ON THE PREPARATION OF THE DOUBLE IODIDE OF POTASSIUM AND SILVER.

SIR,—May I ask your attention to the following—

Problem.—The collected washings by agitation of precipitated iodide of silver from its nitrate is of a dense milky appearance, and does not give a clear supernatant solution of nitrate of potash, although at rest for two or three days; how to separate the minute particles of iodide of silver from the liquid?

Answer.—Take *well washed* precipitated alumina and add it to the liquid, agitate two or three times and allow it to subside each time; after the lapse of some hours the alumina has completely subsided, carrying with it the iodide of silver, pour off the supernatant clear solution of nitrate of potash, and add distilled water to the mixed precipitate of iodide of silver and alumina; then add a few grains of tartaric acid, and well agitate several times, which will redissolve the alumine from the iodide of silver.

The above problem occurred in my practice when following the excellent directions of your contributor *Theta* to make the double iodide of potassium and silver for the Calotype Process. I have no desire to tamper further with, and perhaps render useless, materials which cost 2s. or 4s. 6d. per ounce, and I wish therefore the favour of your assurance that my answer is correct. I do not say the best, but is it correct; and is alumina the only portion of the ingredients which is dissolved? C. B.

[Our Correspondent is quite correct as far as the chemical decompositions go; the alumina would be the only portion of the precipitate which would dissolve; but what is gained by the above plan? The iodide of silver has now to be separated from tartrate of alumina instead of nitrate of potassa, and for either of these purposes the simplest plan would be to pour on a filter and well wash with distilled water.]

GLASS POSITIVES IN LOCKETS.

SIR,—Amongst answers to "Minor Queries" in your "NEWS" for 8th October, I see one to E. M.

As our friend seems to have no other objection to the glass than the difficulty in cutting it to fit the locket without destroying the picture, I think I can put him on a plan to overcome it.

The glass is cut to the required size and shape for the locket, polished on the edges, &c., and is then stuck, by means of a rub of heated gutta percha, to the centre of an ordinary glass plate, which thus serves for a plateholder to it. It is coated, excited, exposed, developed, washed, &c., in the usual way, and by the edge of a knife detached from the large plate.

Of course a pencil-mark should be made on the ground glass corresponding to the size (and position) of the small one (on the large), and allowance must be made in focussing for the thickness of the glass.

Excuse me if I have misunderstood E. M.; but this may be of use to others. Simple, but might not occur to many.

J. F. M.

ANSWERS TO MINOR QUERIES.

THE STEREOSCOPIC ANGLE.—*L. L. B. Cantab.* The appearance of relief in stereoscopic pictures depends upon the lateral displacement of the objects in the foreground with respect to those behind them. The distance between the two lenses is therefore a base-line, and the longer this is, the more exactly can the eye perform the necessary trigonometrical survey of the view in the stereoscope, and thereby judge of the different distances of the objects. In a twin stereoscopic camera this base-line is only from 2½ to 4 inches, and, consequently, the relief will only be small for distant objects. Many persons object to a wider separation in the generality of cases, on account of the diminution it causes in the apparent size of the objects, a very long base-line causing the resulting pictures, when joined in the stereoscope, to look like a little cardboard model of the view.

PHOTOGRAPHS OF INTERIORS.—*Alfred N.* We have seen

very good photographs of interiors taken by almost every process. The requisites are:—1. A good double lens, with either the full, or a tolerably large aperture. 2. A sensitive surface which will keep for some time; such as a plate prepared by one of the dry processes, or a sheet of calotype or waxed paper. We should, however, first of all try wet collodion, as, if the light happened to be very good, it would keep sensitive quite long enough to take an impression. 3. Plenty of time. Arrangements should be made for remaining in the building (or, at least, of allowing the camera to remain there) undisturbed for a whole day, or even longer if found necessary. We once fixed up our camera, exposed the plate, and then pocketed the key; *a week* afterwards, considering the plate had been exposed long enough, we returned, and, on developing, obtained a very good picture. It must, however, always be remembered in these long exposures, that there is no strongly illuminated part in the subject to be copied. A brightly illuminated projecting piece in the architectural ornaments, not to mention shining surfaces of metal, or the direct light of a window, would be fatal to the plate.

NEGATIVE PAPER PROCESS SUFFICIENTLY SENSITIVE FOR PORTRAITURE.—*C. N. P.* wishes to obtain a paper process sufficiently sensitive to take negative portraits. We have met with the greatest success in this line by following Mr. Talbot's calotype process, with some modifications, which are necessary when foreign paper is used. Take French or German thin photographic paper, and cut it about an eighth of an inch smaller all round than the glass plate which fits the collodion slide. Mark the smoothest side, and float that side on the following solution:—

Pure iodide of potassium	20 grains.
Pure chloride of sodium	5 „
Distilled water	1 ounce.

After remaining on this bath for about half a minute, remove the sheet, and dry it between perfectly clean white blotting paper; and having poured a little of the following solution on a clean and level glass plate,—

Pure nitrate of silver	50 grains.
Glacial acetic acid	1 drachm.
Distilled water	1 ounce.

Float the paper face downwards on it, and allow it to remain for about one minute. Meanwhile, take a piece of glass which will fit the dark slide, clean it well, and having levelled it, lay on it a piece of clean wet blotting paper of the same size as the prepared paper. Now pour a little distilled water on the blotting paper until it is *very* wet, and, removing the sensitive paper from the glass of aceto-nitrate of silver, lay it carefully, *face upwards*, on the wet blotting paper, guarding against inclosing air bubbles while laying it down. It will now be found to stick firmly to the blotting paper. Rest it now, face inwards, against an upright board, letting it stand on two or three thicknesses of blotting paper; and when it has thus drained for a minute, place the glass and paper in the dark slide as if it were a collodion plate, and expose in the camera so that the sensitive surface of the paper is next the lens, no glass intervening. The exposure, although longer than collodion, will be far shorter than the ordinary paper processes; and it should take place as soon as possible after the preparation of the paper. When exposed, remove the paper from the supporting piece of glass, and place it, face downwards, upon another glass plate, which has on its surface a small quantity of a saturated solution of gallic acid. The picture will soon begin to appear, and will develop rapidly, and with great intensity, provided the right exposure has been given. When developed, fix in hyposulphite of soda, and wash thoroughly in water in the usual way. When finished, it may be washed, in order to increase the transparency. As all the above operations should follow each other with tolerable rapidity, it will be as well for the experimenter to have all the necessary materials ready before commencing.

TO REMOVE A STOPPER FROM A BOTTLE WHEN FIXED.—*W. H. H.* Several plans have been suggested for removing stoppers when they have become fixed in the necks of bottles. One plan is, to grasp the upper part of the bottle firmly in the hand, and then pressing the stopper sideways by applying the thumb to its narrow side, gently tap it in the opposite direction to that in which the thumb tends to force it, by means of the handle of a chisel or file, the iron portion of the tool being held firmly in the hand. Should this plan not prove effectual, apply a gentle heat to the neck for a few moments, so as to expand it, without expanding the contained stopper, and then repeat the tapping. Another plan is to select a key, the handle of which will just slip on to the wide part of the stopper, and then, having placed a piece of leather, or a few folds of a pocket handkerchief over the stopper, squeeze the key on, and exert a gradual force until the stopper is loosened. Of course if the stopper *won't* come out by this means, it will break off, and so this plan should only be tried as a last resource; and, although we have found it successful with many hundreds of refractory stoppers, our breakages through its means have not amounted to half a dozen. In some cases, particularly if the bottle contains collodion or other inflammable liquid, the neck had better be heated by friction, instead of the direct flame; to accomplish this, pass a stout cord once round the neck of a bottle, and having tied one end to the knob of a drawer, or some such thing, draw the other end tight by the left hand, and, holding the bottle in the right hand, rapidly move it backwards and forwards; the friction of the string round the neck will soon produce a sufficient degree of heat. If the stopper has been fixed in a bottle by the crystallisation of any substance between the stopper and the neck (as frequently happens to the bottle of collodion *iodising solution*), place a few drops of water, or other solvent, round the edge of the stopper, and allow it to remain for a day or two, renewing it when necessary.

TO CORRESPONDENTS.

AGATE.—Try glycyrrhizine in the nitrate bath, as recommended previously.

SECUNDUS.—We have seen some beautiful prints taken by Mr. McCraw, and hope soon to give fuller particulars of the process.—The exact preparation of the dry collodion plates is, we believe, kept secret.

A SUBSCRIBER.—Of the two positions marked on the plan, we think the red is the best, as the sun would be on it all day. Make the room as large and lofty as you can.

SUBSCRIBER, D. N.—The price you name is sufficient for what you want; but we cannot give you all the desired information.

T. C.—If the paper be already albumenised, it need not be so prepared a second time. First wash, then tone, then fix.

AN IRON PLATE is recommended to add a few drops of acetic acid to his bath.

S. D. S.—We cannot recommend any particular kind. We are much obliged for the information; it is not a new plan, but is of very limited value.

A. B. C.—We hope soon to have an article on the subject.

H. H.—Perhaps W. L.'s letter on Fothergill's process will give you the information you want.

G. W. R.—We have never heard of *alabastrine* photographs fading. It could only happen, we should think, through insufficient washing.

J. C.—4 ounces of hypo. to 12 or 16 ounces of water. *Tin* is recommended, as the turpentine effluvia from deal will injure the plates.

W. H. H.—You will not be able to get good portraits with a single non-achromatic lens. Try views only, and use a ½ inch aperture.

No. 35, W.—1. We cannot guess at a reason for the curious effect you name. Try if any modification in the degree of acidity of the bath will remedy it. 2. Add two drops of nitric acid to the bath. 3. Try the plan given in at p. 32. 4. Add one to each ounce of the developing solution.

NEGATIVE.—Fothergill's is the chief favourite just now.

PHOTO. NOVO.—High legal authorities are divided in their opinions as to the state of the law of artistic copyright as applied to photography.

E. H. P.—We are much obliged for your having called our attention to the subject; it shall be attended to.

A CONSTANT STUDENT.—Articles on the subject are in progress, and will shortly appear.

PALEOGRAPHER.—Fothergill's or other dry processes will answer your purpose best. If you object to the smell of the collodion in their preparation, you can purchase them ready for use.

PRESTONIAN.—The larger the aperture, in proportion to the focal length, the quicker will be the lens, if other circumstances are equal.

AN AMATEUR, 15.—We are very pleased with the colours you have produced, and should much like to have further particulars. Try a less exposure.

NEGATIVE, C.—Consult our advertising columns; if the information is not to be obtained there, write to some large firm.

P. H. T. R.—1. Previously answered. 2. It will not injure the collodion.

CYANIDE.—We have never tried the process you name.

Communications declined with thanks:—R. F.—W. C.—Thomas W.—Lamp.—F. R. C. S.—Toning Bath.—X. Y. Z.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—H. S.—Darkle.—C. S. W.—E. A.—G. L. T.—R. S. T.—A. C.—G. K. Q.—An Amateur Painter.—F. A. D.—Paper.—A Correspondent.

IN TYPE.—Ajax.—E. W. B.—A. M.—Euphos.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I, No. 10.—*November* 12, 1858.

OUR PHOTOGLYPHIC ILLUSTRATIONS.

With the present number of the "Photographic News," we present our readers with a specimen of Mr. Fox Talbot's new process of photoglyphic engraving. We had originally intended to have printed all the specimens from the same plate, and thus to have given, with each copy of the "News," the same picture; but several circumstances have induced us to deviate somewhat from our first intention—there being not only one, but a variety of specimens issued; and although with each number of the "Photographic News" there is only one plate presented, should any of our readers wish to possess other subjects besides that given, they can be obtained by purchasing extra copies of this number, and specifying the plates he may wish to have. Various reasons have induced us to adopt this plan. First: Our circulation is so large that, with one plate, it would have been very difficult to have got a sufficient number of specimens out in time. Second: The present plan will, in our opinion, more fully attain the object we have in view—of giving the public some idea of the extent and variety of this new branch of art. Third: We are enabled to present more choice proofs than we could under other circumstances; for it is evident, that when many thousands of copies are printed from the same plate, it gradually wears out—the last thousand prints being less sharp and delicate than the first. But by our present plan of having several specimens, we need only issue the earlier prints from each plate.

The public, of course, do not expect specimens of an art only a few weeks old to be free from faults. They wish to see it in its present state, and by these specimens they will be better enabled to judge as to its future capabilities. With that object in view, we wish now distinctly to state, that these specimens are *entirely untouched*, and are presented exactly in the state in which they were obtained by the process described in our seventh number. No doubt many corrections, as well as improvements *ad libitum*, might be introduced, if it were desirable, by a skilful artist; but this would entirely defeat our object, which is, to show that photography and chemistry combined promise to accomplish for us many results which have hitherto been supposed to demand artistic skill. The great object, as a contemporary has it, is to "make Apollo his own engraver." We merely see at present the commencement of a new art, the future of which it would be difficult to predict with any amount of certainty; but there can be no doubt that its application will ultimately be great and varied.

The accompanying specimens must not be taken as a criterion of the size which the photoglyphic process can be carried to; its manipulations, like photography itself, being purely mechanical, the magnitude of its results is only limited by the materials employed; and the reason why the present subjects are no larger is, that they were from the best specimens of transparent glass positives obtainable. Most of our readers will perceive that the views are taken from those published by MM. Clouzard and Soulier, the celebrated French photographers, who are almost unrivalled in the perfection of their stereoscopic transparencies; and we do not think we are premature in announcing, that these gentlemen are so interested in this new invention that they are preparing some large views of Paris, expressly for the purpose of being engraved in this manner; and we have the pleasure of stating, that as soon as these large views are ready engraved, our readers will have another opportunity of judging for themselves of the progress which this beautiful and wonderful art is making.

The titles of the pictures issued with this number of the "Photographic News" are as follows:—

1. Bridge over the Moldau, Prague.
2. Congress of Deputies, Madrid.
3. Court in the Alhambra, Granada.
4. Palace of the Duc de Montpensier, Seville.
5. The new Louvre, Paris.
6. The Gate of the Cathedral of San Gregorio, Valladolid.
7. The Institute of France.

In our third number we have given a description of some of these plates; we shall therefore now confine ourselves to general remarks upon them. In looking at an ordinary engraving it will be seen, that it must be viewed at some little distance in order to get the general effect of the whole—a close, or microscopic inspection, only showing a number of lines or dots. In photoglyphic engravings, however, we have breadth of effect at a distance; and besides that, by close examination with a magnifying glass, they appear actually more wonderful, as we thus view, instead of crude lines or dots, so astonishing an amount of detail, that nothing less than a personal inspection will enable any one fully to appreciate it. It will be also seen, that there is a beautiful gradation of distance—the middle or half-tints being, at the same time, very distinct; this (the production of a perfect half-tone) being the point upon which all other similar processes have failed. The pictures which best show the beauty of half-tint are Nos. 2, 5, 6, and 7; those in which we have the gradation of distance, Nos. 1, 3, and 4; and those in which microscopic detail is most strikingly to be seen, are Nos. 1, 4, and 5. It will be evident, that subjects of such extreme minuteness, when printed against time, require more than ordinary care in order to obtain good impressions. This has been well attended to by Mr. Brooker, of Margaret-street, Cavendish-square, to whom has been intrusted the printing of these specimens.

In conclusion, we are sure that we shall only be giving expression to the sentiments of our readers when we state, that our and their thanks are due to the kindness and courtesy of Mr. Fox Talbot, for having thus kept us so perfectly *au courant* with the most recent advances of photo-chemical research.

THE STEREOSCOPIC ANGLE.

SIR,—Your correspondent, Mr. Lake Price, appears not to have seen the beautiful stereographic photographs of the moon obtained by Mr. Delarue, taking advantage of the difference of presentation of its globe to the eye in opposite states of libration, as suggested by Mr. Wheatstone, of whose admirable invention of the stereoscope this must be looked upon as the crowning triumph, being, in effect, a step out of and beyond nature. When taken on glass, and seen transparent, nothing can exceed the perfection with which the spherical form and *unity* of object comes out, while the two pictures, viewed alternately with one and the other eye, differ so widely, both in the apparent forms of the spots and in their lights and shadows, that it seems almost inconceivable how they can ever be brought into harmonious consistence.

The mean effect of the moon's monthly libration in longitude is, to displace a spot from her apparent centre around six degrees and a quarter on her own surface; and this, taking place in one situation to the east and the other to the west, produces a total apparent change of place of about twelve degrees and a half, which is the "stereoscopic angle" in this case, and which corresponds at the distance of the earth to a lateral shift of the point of view or of the photographic camera of about 6½ diameters of the earth, or 52,000 miles: so that this stereoscope exhibits the moon to us as it would be truly seen by a giant whose eyes were that distance asunder, if stationed at our distance from it.

As the sun turns on its own axis absolutely in about twenty-five days and a half, and relatively in about twenty-seven and a half, a spot on its surface will shift its place in twenty-four hours about thirteen degrees on that surface. Two photographs, therefore, taken about the same hour on consecutive days, ought to give an equally perfect stereograph with that of the moon above mentioned; and as the spots very often remain but little altered in size and figure during that interval, it can hardly be but that such stereographs taken in favourable opportunities, when large spots are approaching the edge, will suffice to decide by ocular inspection the long mooted question, whether they be really depressions or pits in the sun's photo-sphere or not.

In reference to the subject mooted in your reply to L. B. B. CANTAB, I would observe that a person with a moderately good sight can perfectly well see a solid object *as* a solid, *i.e.*, *stereographically*, at five inches from his eyes. Taking the distance of the eyes at two inches and a half, this gives a stereoscopic angle of a little more than 28°; which is perhaps the extreme of what ought even to be attempted, and that of course, not for artistic purposes. An angle of eleven degrees and a half, which would correspond to a lateral removal of the camera by one fifth of the distance of an object *(however great)*, would, therefore, afford an *excellent visible model* of it in the same relief as if a real model in true proportions, subtending the same visual angle, were placed at twelve inches and a half from the middle point between the eyes—a distance allowing every detail of structure to be most accurately scrutinised, especially if aided by magnifiers.—I remain, sir, your obedient servant,

J. F. W. H.

Collingwood, Nov. 6. 1858.

PHOTOGRAPHIC ATLAS OF THE MOON.

BY P. SECCHI.

AT a recent meeting of the Academy of Sciences the gentleman, whose name appears at the head of this paper, presented an atlas of the phases of the moon, photographed by means of the great Mertz telescope, at the Roman college.

"The diameters of the moons," he says, "are twenty centimètres. The manner in which they were obtained was, by taking a negative proof on collodion forty-five millimètres in diameter; the image was afterwards enlarged with the assistance of a great solar microscope, and in this way a positive proof was obtained on albumenised glass of the desired size. From this positive proof a negative was obtained for printing the picture on paper. The actual dimension represents the moon as it is seen in a telescope magnifying 90 or 100 times, and this size was not exceeded, because if it were, the irregularities in the surface of the paper would equal the inevitable irregularities of the picture, produced by the inequalities of the albumenised and collodion film. These photographs produce an excellent effect when regarded with a glass, magnifying eight or ten times, under a rather powerful light. The conclusions which science may draw from these pictures appear to me very interesting:

"1. I remarked some time since, the enormous difference in the time of exposure required to obtain the moon in its different phases: thus, seven minutes is necessary for the phase of four days, and only twenty seconds for that of the full moon.

"2. The difference of the luminous intensity in the different parts is very great. In the full moon, to have a sufficiently sensible distinction between the different regions of the surface, we limited the time of exposure, as I have already mentioned, to twenty seconds; but while the *mountains* are white the *seas* are almost black. This effect, which is very visible in the moon at night, disappears in the moon seen by daylight; in fact, looking at this luminary while the sun is still on the horizon, the mountains will be seen very clearly on the blue ground of the firmament, while the seas have the same intensity as the terrestrial atmosphere, and, owing to that cause, are invisible. From thence flows a result, perhaps, unexpected in photometry, which is, that the light of our atmosphere, enlightened by the sun, is equal to that of the more sombre parts of the full moon during the night. The same effect reproduces itself in an almost equal degree in the phase of the tenth day, when the crater *Copernicus* appears isolated from all the surrounding parts, which, nevertheless, were enlightened, but the chemical intensity of which is rather feeble, because they belong to the smooth parts.

"3. The lunar images were taken in the months of March and April; in the summer months it was impossible to obtain anything satisfactory, in consequence of the great vividness of the light of the sky, which sometimes even produced reversed images. Hence a very great difficulty in the way of taking pictures of the moon in its earliest phases, the moon being then always immersed in crepuscular light. The atlas gives the 4th, 5th, 6th, 7th, 8th, 10th, 12th, and 14th days. We have omitted some days because the details of the lunar surface are obtained much better in her diminishing phases on account of the great quantity of the smooth and ineffective parts.

"4. These details are interesting as applied to the theory of lunar formations. We shall observe, and not without interest, the vast radiations which spread from the principal craters—especially Tycho, Copernicus, and Kepler. The first is so marked that it gives to the moon the aspect of a globe divided by meridians, the pole being in the centre of the crater itself.

"5. A very remarkable circumstance presents itself in the photographs, which at the first glance appears to arise from imperfection in the execution: it is a kind of indecision of the pictures, and a dispersion of the light in the neighbourhood of the spots, which one is inclined to attribute to a movement of the image, especially in the full moon—but to do so would be erroneous. In fact, this diffusion around the clear parts commences from the tenth and twelfth days, when the well-defined small craters prove the precision of the image. It appears, therefore, that this arises from a stronger illuminating action, which has its source in the asperities which necessarily surround each crater." (The author here appends the following note: —"It would indeed be impossible to obtain an exact phase without the other, for after having found the chemical focus in the lunette, a point of datum was fixed

to find it immediately. This focus was seventeen millimètres more distant than the optical focus. If there is some indecision in the image, that arises from the agitation of the air, and to the movement of the image which ensued, which produced an extreme difficulty, and we were obliged to reject many proofs made on the evenings when the atmosphere was agitated.")

"The photographic execution of the lunar pictures was performed by M. François Barelli, a Roman *pharmacien-chemiste*, and a distinguished amateur in photography. To insure the success of so many phases, it required extraordinary perseverance on the part of the photographer, as well as great intelligence."

ON URANIUM PRINTING.

BY M. CRESPON.

M. CRESPON adds the following information to the paper which we published in a recent number of the "PHOTOGRAPHIC NEWS." Referring to some proofs forwarded to the French Photographic Society, he says:—"These proofs were obtained on paper prepared with the nitrate of uranium without gelatine; the sheet remained ten minutes in the bath; the exposure to the sun was from three to twelve minutes, according to the intensity of the negative proof. The development of the positive picture was with the nitrate of silver alone; the toning was with the *sel d'or* of Fordos and Gelis, and not with the acid chloride of gold. With the latter we do not obtain the beauty and vigour of the blacks which the first gives. Thus, one of the proofs which was obtained by M. de la Blanchère's process, and which was toned with the acid chloride of gold, without being submitted to the hyposulphite, has two drawbacks,—it is not fixed, and does not present the modelling and the shade which in another case was obtained with the same negative, and by my method of fixing and toning.

"It is important not to submit the proof to the hyposulphite of soda until after toning, or it will be wanting in sharpness. Nevertheless the latter method may be employed when the proof has been exposed to the sun for too great a length of time, and is, in consequence, too heavy and dull; and, in this case, the acid chloride of gold may be used for toning, which brings it to a pearl gray tone, pretty enough to look at. The longer the proof, when well developed, is submitted to the action of the *sel d'or* bath, the greater the vigour of the tones when withdrawn from the hyposulphite of soda. A short stay in this toning bath gives proofs which are not wanting either in softness or agreeable appearance."

OBSERVATIONS ON THE PREPARATION OF COMMERCIAL CYANIDE OF POTASSIUM.

BY MM. FORDOS AND GELIS.

MANY processes have been proposed for the preparation of cyanide of potassium, but only three have been adopted in chemical manufactories—those of Robiquet and Wiggers, which give the medicinal cyanide, and that of Messrs. Rodggers, Brothers, known under the name of Liebig's, which supplies the product employed in the arts. Messrs. Fordos and Gelis have analysed the cyanide sold in commerce by different houses, and have invariably found it so impure, that they can only attribute it to a bad method of preparing it. A dozen specimens bought at random, and submitted to certain tests, which gave easily and exactly the richness of these products intended either for medicine or commerce, furnished the following per-centages:—55, 46, 49, 51, 36, &c. Some cyanide which they had themselves prepared with great care, according to the process in ordinary use, yielded only 57 per cent.; in other words, it contained 43 per cent. of foreign products, arising from unknown causes: this formed the subject of the labours of the two chemists.

First of all, we will remind our readers of the process employed by Messrs. Rodggers, or of Liebig, under whose name it is known. Take eight parts of dry prussiate of potash, and three of dry carbonate of potash; that is, exactly an equivalent of each of the two substances and heat them to redness. The melted mixture yields a transparent liquid, which, after being allowed to stand, can be easily poured off from an abundant deposit, and, on cooling, becomes a white mass. This mass, according to Liebig, is a mixture of two combinations—cyanide of potassium and cyanate of potassa in the relation of five equivalents of cyanide of potassium for one equivalent of cyanate. This ought to contain 80 per cent. of cyanuret, but, as has been seen, it is very far from being so rich as that; and, moreover, at each repetition of the melting, a different result is obtained, so that we might say a different product is given on each occasion.

Messrs. Fordos and Gelis came to the conclusion that it was advisable to give up Liebig's process, and to replace it, in all circumstances, by that of Robiquet, with certain modifications suggested by Geiger (*Annales de Physique et de Chimie*). As to M. Wiggers' process, which presents some difficulties in manipulation, these chemists aver that it is quite a mistaken idea to suppose that it yields pure cyanide of potassium. "Of numerous specimens we have analysed not one has indicated a greater richness than 85 per cent." The loss, in this case, should be attributed to the action of the water and the air during the desiccation of the product separated from the alcoholic liquor.

In conclusion, Messrs. Fordos and Gelis have pointed out many important things. They have ascertained the reason why a cyanide of potassium cannot be obtained which does not contain, at least, one-fifth of foreign matter—and there their revelations cease; but if they have indeed discovered, as they assert, a mode of preparing it, by which it is always pure and identical, they keep the secret to themselves.

NEW METHOD OF PRODUCING TRANSPARENT STEREOSCOPIC POSITIVES.

THE process of M. Gaudin which we are about to describe is not altogether new, but it is rapid and economical; and can be practised by all who are accustomed to the use of collodion.

There is no necessity for the collodion being new; on the contrary, an old collodion which has lost much of its sensitiveness is better adapted for the purpose: consequently, it is advisable to preserve the collodion residues, and put them in a bottle, and add a little pyroxyline for the purpose of restoring the tenacity it has lost, and, at the same time, to give it twice the thickness of an ordinary sensitised collodion. It should be allowed to stand until the following day; filtered through cotton; and used in collodionising a glass plate in the usual manner. The plate must then be put in the silver bath in the same way as if it were desired to take a negative. The negative to be copied must then be placed in the frame (that belonging to the camera would answer the purpose), and the collodion plate laid upon it; the door of the frame must be closed, and it ought to have two springs corresponding to the centres of the stereoscopic proofs, in order that the contact between the two plates may be immediate; then, opening the two little opposite doors, the plate should be exposed to the action of daylight for a quarter of a second in the day, and from one to two seconds in the evening, according to the sensitiveness of the collodion. This done, the frame is carried into the dark room, and the plates, which adhere to each other, taken out, and separated—by means of a thin piece of wood introduced between the edges, and used as a lever—very gently, in order that the moist collodion film may not be injured; it may be developed by the ordinary process. Supposing the proof is very large, so that there is risk of injuring the sensitive surface, a ground glass may be used, the inequalities in the surface of this glass causing the collodion to adhere more strongly. It is also desirable that the surface should be perfectly plain, but it is not absolutely essential.

Before contact with the collodionised plate the negative must be varnished; and, after contact, water should be poured over it rapidly, and then it should be lightly wiped.

PHOTOGRAPHY IN ALGERIA.

NO. III.—(*continued*).

No opportunity of getting any picture worth preserving occurred after this until we reached the immediate vicinity of the mountain where the Kabyles had taken up their position. By this time the soldiers were very tired, for though the weather was not nearly so hot as it was two or three months ago, yet it was still hot enough to tell upon one in the desert; and their commanding officer therefore decided on deferring the attack until the following morning at day-break, notwithstanding the impatience of the men to "go in" at once. The mountain was not of any great height, nor difficult of ascent at the lowest part; but we could easily see, that as soon as the first sixty or seventy yards had been got over, the sides of the mountain would be rugged and difficult to ascend. Fragments of rock lay loosely about the sides, which were pretty thickly covered with low shrubs, forming an excellent cover for the natives, and admirably suited for their mode of fighting, which resembles the method practised in the mountain warfare during the peninsular war, and doubtless suggested to them by these very facilities. We saw no indications of any living being on the mountain when we arrived near the foot of it, but the men had no sooner commenced to pitch their tents, and thus reveal their intention not to attack that night, than I noticed a figure rise up here, and another there, and very soon there were so many visible that if every bush had been as prolific as the wooden horse of Troy, they could not have brought forth more ready-armed warriors. Derisive shouts were uttered by them, and every now and then a fellow, more of a *fanfaron* possibly than his comrades, would descend the mountain, so as to come somewhat nearer to us, and pour out a volume of defiant language, in which the opprobrious terms Kaffir and Roumain were alone intelligible at the distance we were from him; and when he had finished, he would discharge his gun towards the outpost, go through a considerable amount of pantomime, expressive of his contempt for us, and then rejoin his comrades. The whole thing reminded me of the scenes before the walls of Troy. The soldiers were all this time busy in pitching their little tents and getting their food ready, and paid not the least attention to this vapouring of the Kabyles; and though it would have been easy enough, I have no doubt, to have knocked over one or two of the most boisterous of these gentlemen, no attempt was made to do so, and I did not notice any desire on the part of even the youngest soldier to engage in such petty warfare. I noticed a surprising difference in the conduct of the men on this evening to their behaviour on the march. There was no noisy levity, but a grave and quiet manner about them which impressed me strongly, and inspired me with more respect for them than I had entertained previously. As soon as the meal was ended, the men lighted their pipes, and employed themselves in cleaning and examining their guns and bayonets; some conversing on the approaching conflict, and others occupied in thought, probably of relatives and friends at home whom they might never see again. As for the Spahis, they behaved themselves much as usual. They were not likely to have any share in the fighting, unless the Kabyles were driven into the plain, and there was little likelihood of their getting any spoil in the affair, which, perhaps, might account for the rather discontented expression of their dark faces.

In the course of the evening I rode with Hamed round a mountain to the east of that occupied by the Arabs, and we ascended it by a long and rather steep path, which eventually brought us out on a plateau, from which we had a full view of the Kabyles opposite, who were certainly not more than three hundred yards distant, and from whom we were only separated by a very deep ravine. It at once occurred to me that if there were no danger of a surprise by the natives, I might watch the whole action from this spot, and possibly get some pictures. I asked Hamed if there was any danger of the Arabs attacking me here; but he assured me that there was not the least, as every man they could muster would be engaged in the contest. I did not like the idea of being up here alone, but the thought of my friends in England, and possibly the desire of making some sensation among photographers by the display of photographs which might be said to have been taken on the field of battle, had something to do with my decision; but I did not stop then to analyse motives, but came to the determination that I would make the attempt. It was nearly ten o'clock when we returned to the camp, and it was requisite that I should start before sunrise, consequently I had to bestir myself to get things ready. I was so anxious, that I woke very soon after midnight, and though my enthusiasm was not so warm as on the preceding evening, yet I would not admit a thought of drawing back; and as soon as I had called up the Arab who was to accompany me, and had warmed some coffee over a spirit lamp, I helped to pack the *matériel* on the back of a horse, and within an hour I was on my way, followed by the native leading the horse. I felt extremely cold, but the air was quite still; had it been otherwise, and at all boisterous, I believe I should have availed myself of this excuse to have returned to camp. I was obliged, too, to ride slowly, for fear we might miss our way, and this added another item to my discouragement. It is one of the greatest bores imaginable to be compelled to proceed at a restrained pace in the dark, when you cannot tell any instant but some individual may spring upon you who would like to cut your throat for the mere honour and glory of the thing; and though it was twilight on the plain, it was almost dark as I rode along between the trees which thickly covered the lower part of the mountain. Happily, once entered on the path, there was no danger of missing my way, and after a ride, which seemed ten times as long as it did on the previous evening, I found myself on the same plateau. In order to operate successfully, it was necessary that I should place my camera in advance of the tall shrubs which were growing all over the plateau; on the other hand, if I did so, there was almost a certainty of my being noticed by the enemy, who might possibly imagine that I had got some new instrument with which I was about to do them some damage, and therefore send a party to anticipate me by putting a bullet into me, or by some other violent and sanguinary measure. After a little thought, I adopted means for concealing my proceedings similar to those employed by the Thanes in their attack on Macbeth's castle: I cut some bushes, and sharpened the points so that they might run easily into the ground, and then planting my camera so that it should command the side of the mountain opposite, I arranged the bushes so as to conceal it until I should find it necessary to commence operations. By this time the sun had risen sufficiently high to enable me to distinguish our camp in the plain, but there was as yet no sign of movement. I therefore went to the edge of the wood to see whereabouts and in what manner the Arab had provided for the two horses. I found them hobbled, and, as an additional precaution against their wandering, fastened to a couple of saplings by long ropes. The Arab had gone to the camp to his master; and though he would have been of no use to me had he stayed, I wished him back. To wile away the time, I lay down and ate a biscuit I had brought with me, and when that was finished I lighted a cigar and crawled to the edge of the ravine, from whence, screened by a shrub, I could see both the camp and the enemy. Soon I perceived the only two guns we had with us brought to the foot of the mountain, and the Zouaves assembling in order, waiting the signal to charge. Then came a puff of smoke from one of the guns, and almost simultaneously with the sound reaching me I saw splinters of rock flying about on the mountain opposite. I was rather surprised that all this time the

enemy had shown no signs of their presence, and I began to fancy they had stolen away during the night; but a second shower of grape, directed among some bushes lower down, showed that they had been stung into existence, and they at once began an irregular fusilade, which, though they are excellent marksmen, was too distant to do us any harm. A few more reports, and the enemy swarmed from behind rocks and bushes, and added by their shouts and firing to the uproar which filled the air. This appeared to me a good opportunity of getting a picture, before the atmosphere became too much obscured by smoke; and I accordingly shut myself in my tent, prepared and inserted the plate, which I exposed for perhaps half a second longer than I should have done under other circumstances. To make sure of the picture, I developed and washed it at once, and placed it against the edge of the tent to dry. These operations were not performed without some trepidation on my part, as you may well imagine, seeing that the firing of guns and the shouts and cries of the Arabs were ringing in my ears the whole time. When I had again reached my former post I found the Arabs had descended lower down the mountain; but when they found that, in proportion as they were massed together, the bullets from the French guns killed and wounded more of them, they dispersed themselves behind the pieces of rock and the bushes. There was now a movement among the Zouaves. They moved at an ordinary pace until they had fairly commenced the ascent of the mountain; then they dashed upward with an unwavering purpose, which was so manifest in their advance, that I should not have been surprised if the Arabs had fled at once, although they enormously exceeded the French soldiers in number. Upwards and onwards, with the steady determination of the youth of whom Longfellow says "Excelsior," came the white-gaitered, white-turbaned, swarthy soldiers. They did not fire a shot, though bullets were flying thickly about them, but came on with the bayonet, resistless as fate. The Kabyles, who, as marksmen, might compare with any troops in the world, and who are naturally as brave, could not withstand the contact of the gleaming steel; they fell back as the Zouaves pressed upon them, though some of them kept up a continual fire from under cover. I chose this moment to take a second picture, and from this time until the termination of the firing I renewed the plates, until I had exhausted the supply I had brought with me. Fortunately, as I thought, the battle was by this time at an end, and the French soldiers had possession of the heights, though parties of them were still engaged in driving off isolated bodies of Kabyles. The outposts were placed, and soon fires were lighted; and the wounded, of whom there seemed to be very few, were conveyed down to the camp; while those who had escaped sat down to a meal which they had well earned. By the time I had arranged my negatives in the box, and put the utensils I had made use of into their proper places, I found that the sun was setting, and I began to feel anxious for the return of the Arab who was to lead the horse carrying the camera and other things down to the camp. It suddenly occurred to me that I would go and see after the horses; but when I got to the spot where they had been tethered they were not to be seen; the ropes by which they had been fastened had likewise disappeared. I was now in a predicament which caused me no little alarm. I could not doubt that the horses had been stolen; the only question in my mind was whether the thief who had taken them had discovered my presence on the plateau or not.*

* The conclusion of this letter will be published next week.

THE LADIES OF JAPAN IN THE STEREOSCOPE.

A GENTLEMAN, who returned not long since from Japan, called upon us a few days since for the purpose of showing us some sketches of Japan and its people, which he had mounted for the stereoscope according to the manner described by us in the article on Mr. Sang's invention. One of the sketches gave an exceedingly pretty view of Nagasaki, but the more interesting pictures were those of groups of females. Their faces are very attractive, from the expression of gentleness which is their chief characteristic. We are sorry, however, to have to destroy the pleasing illusion which exists as to their innocence. If we judge them by our standard, they are among the most immoral on the face of the earth. The gentleman referred to assures us that the women who bring you your tea in the public gardens—which abound—are, without any exception whatever, women of loose character. At Nipon it is difficult even to guess at their number, so numerous are they. This class of women are not looked upon in Japan with the same contempt as here; on the contrary, they very frequently make good marriages, and are invariably well and kindly treated; and in cases where they have been purchased by the keepers of these houses from their parents when very young, these men, if the girls give promise of beauty, expend considerable sums on their education, and in teaching them various accomplishments.

Photographic Chemistry.

NATURE OF THE METALS.

(Continued.)

Aluminum is a metal remarkable for its extreme lightness, and its relative unalterability. It may be obtained by causing sodium to act on its chloride of aluminum when heated to a red heat; either in the air or oxygen it burns brilliantly, absorbs oxygen, and forms the oxide known as alumina, which is a compound of 2 equivalents of aluminum with 3 of oxygen. Alumina is a fine light powder which absorbs water, but does not dissolve in it, and, in this condition, can be moulded into any shape; and when subjected to the action of heat, diminishes in size, and becomes exceedingly hard. It has been imagined that this substance furnished an exception to the rule that solids expand under the influence of heat. Aluminum combines also with chlorine, selenium, sulphur, and phosphorus.

Glucinum is the metallic base of the earth glucina. It can be obtained from the earth by causing potassium to act upon it. It is a very scarce metal. Combined with oxygen it forms glucina, one of the constituents of the emerald. It combines with chlorine, selenium, sulphur, iodine, bromine, and phosphorus.

Barium is a metal which can only be obtained by a very complicated process. It is of a gray colour. It oxidises on being exposed to the air; and a protoxide is formed known as baryta, which, if heated in oxygen, absorbs an additional quantity of that gas, and forms the peroxide. Barium exists in nature in the common mineral sulphate of barytes, from which mineral baryta is obtained by a process it is not necessary for us to describe. Barium also combines with sulphur, phosphorus, chlorine, and bromine. It should be borne in mind that all the compounds in which barium enters are very poisonous.

Strontium is a metal strongly resembling barium in its properties; it is seldom seen, except in combination with oxygen, when it forms the earth strontia, from which it can only be disengaged by a very complicated process. Strontia is the protoxide of strontium, and there is also a peroxide, which may be obtained by heating the protoxide in oxygen. The latter oxide is obtained from the sulphate of strontia. At present the compounds of strontium are of less use to photographic than to pyrotechnical chemists; the latter availing themselves of a quality possessed by some of them, of colouring flame a brilliant red, in the manufacture of what, in theatrical parlance, is termed red fire.

Uranium is a metal which recent events have forced on the attention of photographers, the qualities of which are much disputed. It is obtained from the mineral pitchblende. The manner in which the salt of uranium, employed in

photography, is obtained, is by pulverising the pitchblende, and then attacking it with nitric acid, which dissolves it with great facility. The solution is evaporated to dryness; then water is added for the purpose of dissolving the nitrate of uranium, and any foreign salts that may be present. The liquid is concentrated, and a deposit of yellow crystals, with a greenish reflection, takes place; these crystals are nitrate of uranium. To purify them, they are re-dissolved in water, which is again evaporated, until the liquid is sufficiently concentrated to deposit the crystals. These crystals are now sufficiently pure for use; but if extreme purity—and such purity is desirable, if not essential, in all substances employed in photography—be desired, the crystals may be again dissolved in ether, and re-crystallised. Uranium is obtained from the chloride by a precisely similar process to that employed for obtaining several other metals which have been described, viz., by the agency of potassium.

Cadmium, in certain of its compounds, is somewhat extensively employed in photographic operations. The iodide and bromide are used in the preparation of iodised or bromised collodion—the object of their employment being to give more stability. Thin sheet cadmium may be employed for making the iodide in the collodion itself, by placing a sufficient quantity of it in the collodion and then adding iodine; the two substances react on each other, and the iodide is formed, which remains in solution. The decoloration of the liquid indicates when the operation is completed.

Dictionary of Photography.

ACHROMATISM.—The production of the achromatic lens is the result of one of the most beautiful and ingenious expedients in the science of optics; and, at the same time, it is not at all difficult for moderately scientific readers to understand.

When a ray of sunlight is allowed to fall on a prism, or the edge of a lens, it will be decomposed into its constituent colours, and the result will be the beautiful band of colours, known under the name of the solar spectrum. The reason of this is, that each separate colour is bent or *refracted* out of its course in a different degree. Red being the least refrangible, will deviate the least from the original course of the ray, whilst the violet, being the most refrangible, will fall below the red ray, and the other rays being of intermediate refrangibilities, will fill up the intervening space, lying side by side, and the whole forming the spectrum as shown at page 31.

It was at first thought that all kinds of glass, when made into prisms or lenses, if they possessed the same mean refractive power, would also produce spectra of the same length from the red to violet, or, in other words, would have equal dispersive powers; and hence that achromatism, or the destruction of colour, could only be effected by opposite and equal refractions; and, as in this case, the beam, after being refracted and dispersed by one lens, would be affected to just

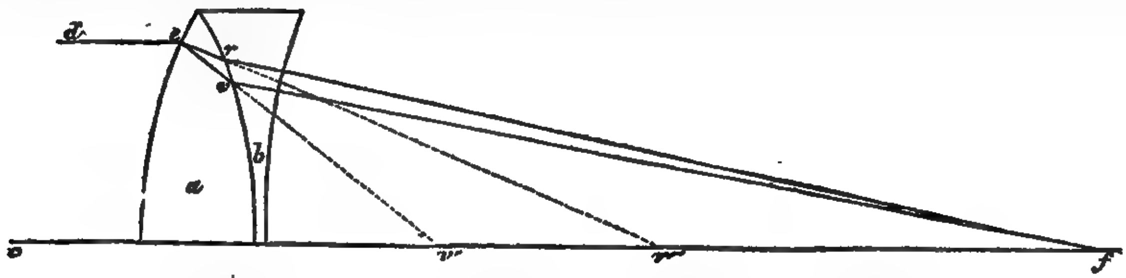


DIAGRAM SHOWING THE COURSE OF A RAY OF SUNLIGHT THROUGH AN ACHROMATIC LENS.

Manganese has not as yet been applied to photographic operations, but is exceedingly useful for various purposes. It is used by glass-makers to give a purple colour to glass, and also for rendering glass colourless. These opposite effects depend on the strength of the oxide—manganese combining with oxygen in four proportions. If glass be rendered green by the presence of protoxide of iron, a small quantity of binoxide of manganese added will discharge the colour, and make the glass colourless; this effect is accomplished by a portion of the oxygen in the binoxide of manganese being attracted to the iron—the latter becomes a peroxide, and loses its colouring property; while the binoxide of manganese which is capable of giving a purple colour to glass, is reduced to the condition of a protoxide, which has not that power. This metal is obtained from the black oxide of manganese, which is, in fact, the binoxide, and as such is commonly found in nature. This oxide is largely used by chemists for the purpose of procuring oxygen, and also for liberating chlorine from hydrochloric acid and sea salt, iodine from iodide of potassium, &c.

Chromium is a metal which, as such, is not at present used in photography, though it is of great use in the arts; to its presence, in combination with oxygen, various pigments are indebted for their colour. The bi-chromate of potash is of great importance in most systems of heliographic printing, in which it is employed mixed with some organic matter. Recent discoveries, especially Mr. Talbot's new discovery of Photoglyphy, show it to be a substance of primary importance in such operations.

(*To be continued.*)

the same degree in the opposite direction by the other lens, it was evident that the ray would emerge parallel to its first direction, and thus the object of the lens, viz., *convergence* of rays, would be lost. Further experiments, however, proved that this conclusion was erroneous, and it was found that *flint* and *crown* glass, whilst their mean refraction is different, disperse equally, or produce spectra of the same length. Our present achromatic lenses are consequently made of these two kinds of glass.

Let *a* be the section of half a convex lens of crown glass, and *b* of a concave lens of flint glass, *c f* their common axis. If *d e*, a ray of sunlight, fall upon the external surface of the crown glass *a*, the red or least refrangible ray will take the direction *e r*, and the violet the direction *e v*; and if these rays were not intercepted, they would proceed to the axis, and there form coloured images at *r' v'*. The concave lens, however, now causes a divergence of these rays to take place, and the ray *e v* being, as before, more refrangible than the ray *e r*, they gradually approach each other, and are reunited at *f* the focus, where a nearly colourless image will be formed. The reason why the image is not quite colourless, is on account of what has been termed the irrationality of the spectra of the two kinds of glass, that is, the several colours have not an exact proportion one to another, and, consequently, they cannot be perfectly reunited by the second lens after having been separated by the first.

The terms *over* and *under*-corrected are explained as follows:—If the lens *b* in the diagram is not sufficiently curved to effect the reunion of the two coloured rays *r f* and

v f, the lens is under-corrected; if, however, it do more than is required of it, the lens is said to be over-corrected.

ACIDS AND ALKALIES.—*Acids* are, as a general rule, distinguished by their solubility in water, peculiar sour taste, and the property which they possess of turning vegetable blues red. Tincture of litmus, for instance, is of a blue colour, which is easily changed to red by a very small quantity of acid; and this property is made use of by photographers and chemists, who employ paper which has been stained with this tincture, as a test for the presence of acid in a solution.

Alkalies are distinguished by many properties exactly opposite to those characterising acids. They are soluble in water, and have a burning, disagreeable taste. They restore the colour to some vegetable infusions which have been reddened by acids, and others they turn green, as in the case of infusion of red cabbage, and syrup of violets. They also turn several vegetable yellows brown, as turmeric and rhubarb. Litmus paper which has been dipped in a very dilute acid, so as just to give it a red tinge, is an extremely delicate test for showing the presence of an alkali, as the slightest trace of this latter body restores the blue colour. *Turmeric* paper which is changed from yellow to brown by alkalies, is sometimes used for this purpose; but it is not so delicate a test for the presence of an alkali as red litmus paper.

Acetic, nitric, and tartaric acids are common instances of the class of acids, and potassa, soda, and ammonia, of the class of alkalies. Each class is remarkable for its energetic chemical action.

(*To be continued.*)

A Catechism of Photography.

VII.—VARIOUS PROCESSES.

Q. ARE all photographic operations conducted on the same plan?

A. No. All photographic processes have, in common, the object of producing an extremely thin surface-layer or film of iodide of silver, for the reception of the image which is to form the picture; but they differ in the modes by which this is effected, and in the substances used to support the surface-layer.

Q. Do all photographic processes depend upon the action of light?

A. All photographic effects are the result of the chemical action of light on prepared surfaces, and, in the pictures so procured, the lights and shadows are reversed from what they are in nature. The whites are black, the blacks are white; the darkest shadows are the brightest lights, and the brightest lights the darkest shadows. A photographic picture of this description is called a *negative*. An impression taken from such a negative, in which the natural effects of light and shadow are restored, is called a *positive*.

Q. Are all photographic pictures, taken in the camera, negative?

A. Not all; in the daguerreotype the *positive* picture is taken at once, and the same thing has sometimes been done with the collodion.

Q. Are the various processes of photography very numerous?

A. They are; but they may naturally be divided into four principal sections, namely, paper process, the collodion process, the albumen process, and the daguerreotype.

Q. Does not each of these divisions contain many varieties of process?

A. Each division contains many varieties of process, but all agree in the same leading features. To indicate every process would involve endless and useless trouble, and could only perplex and discourage the young photographer. It is best to look at each in its most simple form, and as it is generally employed, without detailing the various modifications which almost every photographer introduces for himself.

Q. Which is the best process of photography?

A. Each has its advantages and disadvantages, its claims and its drawbacks; each is very excellent in its way; and it must be left to the taste and judgment of the operator to select that process which he finds most convenient to him.

Q. What opinion is generally entertained as to their respective merits?

A. The collodion process is considered the best for taking portraits, on account of its rapidity of action. The paper process is admirably suited to the travelling artist, who is desirous of securing exquisite souvenirs of his wanderings. The albumen, again, has its advantages; and the daguerreotype is not without its warm and devoted advocates. In the daguerreotype we have extreme microscopic minuteness; in the collodion, the highest degree of sensitiveness; the albumen rivals the daguerreotype in sharpness of definition; while the paper processes combine many of these good qualities, and possess advantages which cannot be overlooked.

VIII.—CALOTYPE.

Q. What is meant by photography on paper?

A. Under the name of photography on paper we place the different processes by means of which we immediately obtain a negative photograph on prepared paper.

Q. Are the principles of photography on paper the same as those of the collodion and albumen?

A. The principles of photography on paper *are* the same as those of the collodion and albumen—namely, the obtaining of a surface coating of iodide of silver, on which to receive and develop an image; but the mode of preparation is different. It would be tedious and useless to detail all the various plans, with all their modifications, which have been proposed. It is best for the young photographer to confine his attention to those most generally employed.

Q. Who was the first discoverer of a photographic process on paper?

A. Mr. Fox Talbot.

Q. What did he discover?

A. That paper, the surface of which had been previously prepared, received a photographic image when placed in the camera. This he called the calotype, but, in compliment to the discoverer, the term Talbotype is now more generally employed.

Q. When did Mr. Talbot's discovery first become known?

A. Early in 1830 the results of Mr. Talbot's process became known, and specimens were handed about in the scientific circles of London and Paris. Mr. Talbot protected his discovery by a patent, but with his characteristic generosity he has since made a free gift to the country of the result of his valuable experiments.

(*To be continued.*)

Correspondence.

FOTHERGILL'S PROCESS.

SIR,—In my notes on Fothergill's Process, sent last week, I omitted to mention that the "developer" requires the addition of 10 drops of a 25 grain solution of nitrate of silver to the ounce. You will doubtless find in the various communications elicited by your request for information on this subject, the same discrepancy which pervades almost all the published accounts of its manipulation. To those who have no inclination to examine into its *rationale*, the difference of opinion as to the amount of washing absolutely required on the withdrawal of the plates from the nitrate bath will be very perplexing. In Mr. Fothergill's letter in the *Times* of April 24, the directions are simply "to wash the plate with rain water, and after draining for about half a minute, to pour on the collodion film dilute albumen" (one egg and a quarter of an ounce of water). He does not recommend the use

of "liquor ammoniæ," but I have ascertained by frequent experiments, that this does no harm to the plate, but aids materially in clarifying the solution, which, without it, is slightly opalescent. Some of my friends have failed altogether with this process, simply in consequence of their supposition, not perhaps unnatural, that the object of the first washing was to remove all the free nitrate from the sensitised film; and it is probable that the very indefinite directions on this *most important point*, in the letter alluded to, have made many despair altogether of deriving any advantage from this most opportune discovery. Had it not been for the valuable information I derived from Mr. Keene, of Leamington, before the publication of Mr. Fothergill's communication, I should probably have fallen into the same error. The chief points to be borne in mind seem to be, that the washing of the film is simply to remove the nitrate solution attached to its surface, and that on no account must any attempt be made to displace that portion which has penetrated the molecules of the collodion. Pouring the water upon the plate with any force, or violently moving it on the surface in the washing bath, will certainly be fatal to success. The combination of the albumen with the imprisoned nitrate, and the formation probably of albuminate of silver, or, at all events, of an extremely thin film insoluble in water, seem to constitute the essence of sensitiveness, and preservation from change, either by atmospheric influence, or chemical decomposition.

Now for one word in conclusion on the "vexed question" of the *amount of washing* required. All are, I presume, agreed on one point, that sensitiveness is depressed in the same ratio as the quantity of water employed for this purpose is increased. I began with half an ounce, poured very gently on one corner of the plate (stereo. size) placed on a levelling stand, and tilted gently, so as to produce a wave-like motion for about half a minute, by which time all greasiness had disappeared from the surface. Plates so prepared are very sensitive, and although my bath is slightly acid, I have constantly taken stereoscopic pictures in the shade, out of doors, in twelve seconds—a specimen of which, badly printed on damaged paper, I inclose herewith. But I found that I could not place such dependence on the keeping qualities of these plates as was desirable. They occasionally exhibited, at the corner on which they rested to dry, the appearance indicated in the specimen negative which I also inclose, which, though not absolutely fatal to the picture when printed on paper, would prove somewhat damaging to a transparent positive. This has induced me to sacrifice sensitiveness to certainty; but when I wish to employ dry plates for portraiture, for which this process is exceedingly well calculated, I invariably use the smaller proportion of water. In the admirable pamphlet published by Mr. Ackland, vol. i. p. 17, I was astonished to find that he recommended for the first washing *six ounces of water*, and, suspecting that this was a misprint for *six drachms*, I wrote to Mr. Ackland to ascertain the fact, and received from him the following reply:—"I find that the quantity of water stated (6 ounces) is not too great for our collodion, but as every reader does not purchase from us I have substituted the additional directions inclosed, which appear suitable for all samples." (These have appeared at p. 17 of the "PHOTOGRAPHIC NEWS," vol. i.) Mr. Ackland then continues, "You will observe the plate must be very gently washed, then placed in a definite solution of nitrate, and then drained 50 to 60 seconds before pouring on the albumen; this latter is important with some samples, to gain intensity. My success with this plan is constant, and others who practise it are succeeding also. The bath may be neutral, alkaline, or *slightly acid*. I am inclined to believe that in these plates we have no free nitrate left, all is decomposed, as they *keep without a* stain for two months, and appear as though no change had taken place. Three or four of my correspondents have complained of stains spreading upwards from one corner to about one third of the plate, but as I cannot produce such stains, I cannot explain them."

The plate which I inclose (the negative of my house) was exposed about a minute, after having been sensitised a fortnight, and the stain which it exhibits was distinctly perceptible before exposure (lens 4½ inches focus). It is a fact worth knowing, that the behaviour of a plate during development is indicated almost to a certainty by its appearance previous to exposure. Stains are always to be suspected when the tint of the iodide of silver is not uniform; the slightest darkening of the yellow is the sure precursor of a stain.

Nov. 1st, 1858. W. L.

[The negative with which we have been favoured is one of the most perfect we ever saw, both in respect to half-tone and vigour.—ED.]

EMPLOYMENT OF LEAD IN PHOTOGRAPHY—NOTES ON THE STEREOMONOSCOPE.

SIR,—As the problem of printing photographs with a "printers' ink" blackness is at present *the* question with photographers, I beg to communicate a small fact which I have observed in my experience.

After sensitising some paper, I affixed it by a pin to a wainscot, painted stone-colour; and where the silver solution, in dropping down it, had accumulated, I found, after light had been admitted sufficiently, a black spot, resembling the bloom on a negative, very much the colour of printing ink, but with a brownish tinge. Concluding it was the lead in the paint that caused it, I made some experiments with acetate of lead; but as my knowledge of chemistry is very slight, you will not be surprised at learning I did not succeed as I had hoped. Not having heard of lead being used for darkening positives, I thought a recital of the bare facts might be of some little value.

I have been much interested in reading M. Claudet's paper on the Stereomonoscope—the more especially as it is the realisation of an idea which occurred to me nearly two years ago. I add an extract from a letter I then wrote to a contemporary:—"Shortly after being attracted by the charms of our beautiful, but somewhat fickle mistress, it struck me that the transparent stereoscopic views would form excellent slides for the magic lantern. Following up this idea, it occurred to me that if two lanterns were employed as in dissolving views, and the two views thrown to one point, the stereoscopic effect would be produced."

You will thus perceive that, so far, M. Claudet and myself agree in principle, although we differ in application. But here I stopped;—for after my communication was in print, I saw, while studying a slide, with this idea in my mind, in a moment—what I must have been very stupid not to have observed before—that the perspectives of the two views would occupy different positions on the medium to be employed for receiving the rays, and thus cause great confusion; and not having the necessary apparatus by me to prove myself wrong, I at once gave up all further thought about it.

In writing this, I do not wish to claim the least share in M. Claudet's discovery or his application of it, as, but for the peculiar properties which he has found ground glass to possess, the attempt to carry out my original idea would be like playing the tragedy of *Hamlet* with the part of Hamlet omitted. My object is to obtain his opinion as to the feasibility of employing the magic lantern in the manner I have described, and throwing the image on to a large plate of ground glass, so as to enable an audience to enjoy, all at once, the delightful illusions of the stereoscope,—the goal I had in view when I first speculated on the matter. Apologising for the length of this note, I am, Sir, yours very obediently, ALFRED MOLSON.

STEREOGRAMS FROM FLAT SURFACES.

SIR,—I have had much pleasure in reading your very fair criticism of the stereographs of "The Bottle," and your amusing plan for making them. There is only a single thing I could have wished to have been different in your

paper, and that is, the absence of any remark that the stereograms were put forth as merely an attempt, which you will observe they bear to be on their title. I would not have ventured to notice this, only that I have now the pleasure of sending you a much better card of the same nature, "The Sultan and the Commanders of the Allied Armies." The cards of "The Bottle" were done with imperfect, but gradually-improving apparatus, so that they are unequal in quality, and plenty of faults can be detected in those of them first tried, especially if they are examined with a microscope. The process of stereographing them is very difficult. At first sight you may perhaps imagine that the heads of the figures on this card are, as you have described, flat, and as if they had been cut out of paper; but on a more attentive examination, you will find that in reality they, as well as all the other parts of the picture, are solid and round. The thinness apparent at first sight is owing to the heads in the engraving being little more than outlines. A slight defect in the position of the hind legs of Napoleon's horse, which you will perhaps detect on minute examination, is due partly to the drawing, and partly to the side motion between the picture having been purposely exaggerated in order to make the rounding of the figures more apparent. The exaggeration, however, is no more than is allowable, or at all events is less than that in nine out of ten of the stereoscopic views taken from the round. JOHN SANG.

Kirkaldy, 8th Nov., 1858.

VIEWS FOR PHOTOGRAPHERS NEAR LONDON.

DEAR SIR,—D. E., or other subscribers to the "PHOTOGRAPHIC NEWS" who wish to take views near London, would do well to visit Woodford, where beautiful photographs might be obtained. The village of Chigwell, three miles from Woodford, has also some very pretty scenery. Woodford is about ten miles from London, and may be easily reached by the Eastern Counties Railway, either from the terminus at Fenchurch-street or from Shoreditch.

F. W. B.

Photographic Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.—ANNUAL GENERAL MEETING, *3rd November*, 1858.—MR. LUND, in the chair.

The CHAIRMAN stated that Mr. Cottam, the late hon. sec., having been obliged to resign his secretaryship from ill-health, Mr. Mann had been appointed the hon. sec. of the Society.

After the election of the officers of the Society for the ensuing year, it was unanimously resolved that a vote of thanks be returned to Mr. Cottam for his past services as secretary.

In consequence of the absence of both the treasurer and late secretary, from ill-health, the annual report was not prepared for the Society, but would be ready by the next meeting; it was stated that there was a small surplus now in the hands of the treasurer. Three new members were ballotted for and elected. Some very beautiful landscape and sea views, with clouds, by Mr. Kibble, of Glasgow, were exhibited to the members and much admired; also four beautiful prints from collodio-albumen negatives were presented, by Mr. Sidebotham, to the Society's portfolio.

A few prints taken by Mr. McCraw's bichromate printing process by a member, were shown, but considered very unsatisfactory, some being half positive and negative, and some quite negative, and otherwise imperfect.

A letter was read by the secretary from the Liverpool Photographic Society to the members, inviting them to a conversazione at Liverpool on the 18th instant, when Mr. Shadbolt has promised to read a paper. The secretary also read the following report of the Committee appointed to experiment on the various dry processes on glass:—

"The Committee appointed in November, 1857, to examine the published dry processes on glass, present the following report:

"Each of the processes has one or more good qualities not possessed by the others, and by all of them good pictures may be produced; but it is only when the various processes are carefully tried by the same individuals that a true comparison can be made.

"After very careful experiments your committee have arrived at the conclusion, that the best dry process yet discovered for landscape photography is the Taupenot, or collodio-albumen process. Its superiority consists in its rapidity and certainty, and also in the beauty of its results; the fact that, since this committee was formed, the members who previously had successfully practised the albumen, the oxymel, and the dry collodion processes, have abandoned them for the collodio-albumen, greatly favours this conclusion.

"Your committee briefly state what they consider the points in which the other processes are inferior.

"*Albumen Process.*—The long exposure and development required, and the difficulty in the preparation of the plates, so as to produce an even film, perfectly free from spots.

"*Dry or Baked Collodion.*—The difficulty of procuring a collodion of suitable character; also, that the plates do not bear long keeping, nor prolonged development.

"*Oxymel.*—The long exposure required, and the difficulty of carrying a stock of sensitive plates, and keeping them free from dust. The modification of this process, lately published by Mr. Llewellyn, appears very promising, being founded on the correct principle of leaving a definite amount of free nitrate of silver on the plate; but your Committee are not prepared to report finally upon it, although several members have tried it, and speak very favourably of its results.

"*Gelatine Process* (Dr. Hill Norris's, and others).—The time of exposure required is considered to be at least double that of the collodio-albumen; your committee have tried great numbers of plates, prepared both by themselves and Dr. Hill Norris, taking the same views upon them, and on collodio-albumen plates, and their experience, in every case, shows that a *very much longer* exposure is required than that usually recommended.

"In common with all dry processes, there is often a deposit formed on the plate during the development; this, in collodio-albumen, can be entirely removed, but in gelatine it cannot, without destroying the picture. Since this committee was formed, Mr. Fothergill has published his process, which promised much from its simplicity; it has been carefully tried by some of the members of this committee, and by them considered not equal to the collodio-albumen process, in the long exposure required, and, also, in the negatives obtained being of inferior quality, also, any deposit formed on the plate cannot be removed.

"Your committee will now briefly state what they consider a few of the advantages possessed by the collodio-albumen process:—

"Any good collodion, whether positive or negative, will do for this process.

"The albumen, being prepared with ammonia, will keep almost any length of time.

"The exposure required is moderate; pictures may be taken with an exposure of 15 seconds and upwards, according to the focus of the lens, subject, &c. The exact amount of exposure is not a matter of such great importance as in some processes. A negative either over or under-exposed a little, may generally be so treated in the development as to come out quite perfect, whilst any deposit which may be formed on the surface can be easily removed by the finger without injury.

"The great drawback to this process, viz., the liability of the plates to blister, may be entirely avoided by adopting the following precaution:—

"Have the plate thoroughly dry before coating with collodion; leave the film to set well before immersion in the bath; and, after coating with albumen, and the plate well drained, dry it quickly with the face to the fire.

"During the investigation of the various processes, your committee have been strongly impressed with the difficulty under which photographers labour, in the multiplicity of the published processes, each of which is said to surpass all others. Many photographers, working almost alone, are inclined to think too well of their own productions, and, consequently, of the process they use; and your committee think it would be a great benefit to the members of this Society, if specimens were to be procured from well-known operators, or inventors of new

processes, showing, as far as possible, of what each process is capable, and, also, serving as standards by which to judge their own productions."

A vote of thanks was then unanimously passed to those gentlemen who experimented upon the various processes and prepared the report. A general discussion as to the collodio-albumen process took place, particularly as to the blistering of the film.

Mr. Broughton stated that he had very successfully removed the red colour of collodio-albumen plates occasioned by long keeping, and took with him a reddened plate, belonging to a member, which he promised to bring to the next meeting free from the red colour. He stated the plan he adopted was, to use a very weak solution of bichloride of mercury.

Mr. Parry explained his contrivance for drying collodio-albumen plates after the albumen coating, consisting of a gas-light under very fine wire gauze.

It was proposed and agreed that a lantern should be obtained by the next meeting, and that members be invited to bring transparencies for exhibition. And after passing a vote of thanks to the Chairman for his services, the proceedings closed.

Miscellaneous.

The Present Position of Photography.—The following able remarks on photographic matters appeared recently in the pages of our contemporary, the *Literary Gazette*. Our object in transferring them to these columns is to give them a circulation among those whom they are likely to interest; and, moreover, we think that they deserve to be well known and read. After noticing the service which photography has rendered to the world, it says that—" At first it seemed likely to be confined to making black and blotchy libels on the scenery of nature, or sullen caricatures of humanity. Now not only has it, as every one has seen, attained the power of preserving, in nearly all their strength and grace, manly intellect and feminine loveliness, but it has come to be regarded as an invaluable adjunct to the man of science, the artist, and the antiquary. By the astronomer and the meteorologist photography is employed to keep a sleepless record of the observations made by the exquisite automatic instruments now constantly at work for so many important purposes. By it the phases of the moon, the aspects of the sun, the culminations of the planets, are depicted with a delicacy and precision previously supposed unattainable. The anatomist has availed himself of it in cases where the pencil would have been of very inferior service. Professor Owen can tell of what singular aid it has been found in certain palæontological and geological inquiries. The archæologist, the philologist, and the historical investigator are discovering in the fac-similes of rare manuscripts, documents, and inscriptions, which only photography can yield, that a new instrument of great power has been furnished them. While artists and lovers of art now find in it not a substitute for thought, imagination, and observation, but an assistant by whose help they may be better enabled to grapple with the increased requirements of their calling, and perhaps to create in the coming years that new style which the exigencies of the coming years may demand. Much doubtless remains to be done by and for photography; but the astonishing progress which it has made during the brief time it has been in existence justifies the anticipation that neither the art nor its professors will be found wanting. Already, by the Instantaneous Process, a clear and unimpeachable picture may be obtained of the most evanescent phenomena. And when a true copy can be taken of a printed page rotating on a wheel in rapid motion, and only illumined by a lightning flash; the representation be effected of a bomb-shell in its flight through the air; a scene be caught from the deck of a steamer in swift progress; the precise curve and curl and light and shadow of a falling wave be fixed upon paper—all of which remarkable feats have been accomplished—what can be regarded as unattainable when the process is still further improved, and the vehicles are rendered still more sensitive and permanent? Or what may not be anticipated from other as yet undiscovered processes, or the improvement of those already known, in a pursuit which is engaging the attention of so many men of the highest professional and scientific attainments, and the acutest intelligence, in every part of the civilised world?"

Photographic Notes and Queries.

SEDIMENT IN DEVELOPING COLLODIO-ALBUMEN PLATES.

Sir,—Owing to the expense of distilled water, I have been lately using common rain-water in the collodio-albumen process, and on developing I have frequently been annoyed by a sediment forming on the plates during development, and thus giving rise to spots and stains. Can you suggest any remedy for this inconvenience? Δ

Torquay.

[The sediment complained of by our correspondent no doubt arises partly from the use of impure rain water. This, except caught in the country and in the neighbourhoods free from smoke or atmospheric impurities, is frequently very much contaminated with organic matter; also, after a continuance of dry weather, considerable quantities of free ammonia may be present in the first rain that falls, and this would be fatal to most photographic operations. Our correspondent must have over-estimated the expense attending the employment of distilled water in the collodio-albumen process. It can be procured of any respectable druggist for about sixpence per gallon, and as it need not be used for all the different operations, but merely for the *last* washings, and in the preparation of the various solutions, the expense for each plate would be too small to be estimated. However, it frequently happens that when pure distilled water has been used for all the operations, the gallo-nitrate turns brown, or deposits a sediment long before its developing properties are exhausted, and therefore it is better to employ some method of operating by which this evil may not injure the picture when it does occur. The best plan is to allow the development to proceed with the plate lying on its face, which can easily be effected by pouring the solution on a perfectly level glass plate or in a flat porcelain dish, and then laying the impressed plate face downwards carefully on to the solution, contact being prevented by placing a slip of glass, piece of silver or platinum wire, or some such innocuous substance, under one corner of the plate. By this means any sediment which may be produced will fall to the bottom, and cannot injure the picture, and the progress of the development can be seen without disturbing the plate by the contrast of the picture against the white porcelain dish, or, if a glass plate be used, by placing a sheet of white paper underneath.]

APPARATUS FOR PRODUCING A GRADUATED BACKGROUND.

Dear Sir,—Having read in the "Photographic News," and other journals, the various methods for producing graduated backgrounds, but not approving any plan I have seen published, I give the following, which I have used some years, and which I think will answer better than taking all the trouble, let alone the waste and constant attention, requisite to produce each single positive. I allude to the plan of taking a positive, cutting out the background, then printing from it; going out again into the light, and shading off those portions to remain light. What, in the name of all that's photographic, do we want to take all this trouble for, when the following simple piece of apparatus will answer all purposes, and do it as it should be done? Those who have plenty of money will construct one of zinc, or other material, and those who are not overburdened will do what I have done, make it of wood or pasteboard. (Really those who follow this art, by way of amusement, had

needs be a jack of all trades.) You will understand this plan directly I tell you it is simply a pendulum, with a star, circle, or oval, about two feet in diameter, of any shape or make—I prefer it circular—fixed at the top of a straight piece of wood heaviest at the bottom; the point of suspension is on the edge of this circle, which may be a piece of stout wire in the head rest, or a properly constructed stand, to raise or lower it to any height required; it must be coloured lighter than the background, a shade or two in the centre, getting darker towards the edge, which should only be a very little lighter than the background; this may be done by striking *a brush, dipped in the colour*, against a stick, thus spotting it—you can take a picture and try the effect. If a star is used it will not require this, but may require a little in the centre to prevent too much light behind the head. A ray of light may also be introduced by having a movable piece to fix behind, extending beyond the background; this must be shaded so as to produce the light strongest at the outside edge, gradually lost in the light behind the figure: this requires the eye of an artist, but I have no doubt that, with moderate ability, many pleasing and artistic effects can be produced. I think you will understand, from the foregoing, that this piece of apparatus is placed at the back of the sitter, in such a position as will give the best effect, and kept in motion, with the aid of a piece of string, during the whole time the picture is being taken. The above is for a moderately dark background; if a light one, it must be coloured dark in the centre, and lighter towards the edges; this will give a shadow behind the figure, lost in the background. B. Hunt.

EMPLOYMENT OF A CAMERA AS A MAGIC LANTERN.

Sir,—In consequence of the general interest taken in magic-lantern representations, I was pleased to see the suggestions in your valuable periodical of October 15th, and accordingly proceeded to put in operation the directions there laid down, by placing a *portrait* lens camera upon a shelf attached to one of the sides of my *dark room*, with a perforation to let the *tube* of the camera through into the sitting room.

Having placed a white screen at a distance from the lens corresponding to the distance occupied by the subject of the negative plate from which the transparency was obtained, I then placed the transparency in a dark slide so as to allow no light to pass, except what passed exclusively through the transparency—the light of a strong moderator lamp, with a *globe on*, at about four inches from the transparency; and, having obtained a proper focus, was disappointed to find that, although there was a very perfect magnified representation of the picture on the screen, it was so *imperfectly illuminated* that it gave nothing more than a badly illuminated scene or view, as if obscured by night.

Will you kindly inform me of the cause of my want of success, and suggest such remedies as will enable me to obtain more successful results. T. H. S.

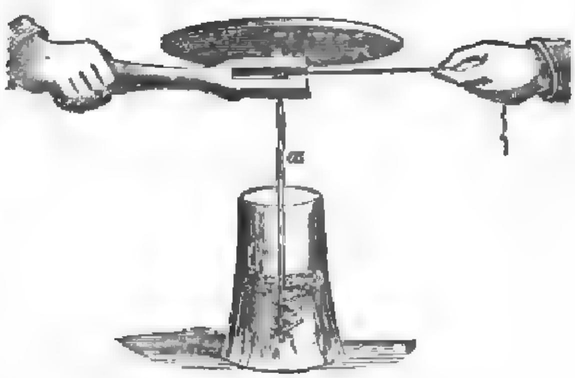
[Insufficient light is the sole cause of our correspondent's want of success. The above plan can only be used when the image is not required to be very large. If more illumination be required the transparency must be removed *pro tem.*, and the lamp having been placed in position put a concave behind it, and a large bull's-eye lens between it and the camera, varying the distances until a bright disc of light is thrown on the screen, then insert the transparency, and proceed to focus.]

MR. McCRAW'S PROCESS.

Sir,—Your correspondent C. B. (vol. i. p. 94) has evidently exposed the papers too long, a very short exposure being required. I have some prints which have turned out positives, and some negatives, when the difference in the time of exposure was only a few minutes; and I have one in which one portion of the print (the foreground) is negative, and the sky, with the trees against it, a decided positive. What I have produced are very poor, dirty-looking prints, and do not offer any encouragement to persevere in the process. J. S.

[Mr. McCraw has favoured us with some specimens of his process. They are very successful both in colour and brilliancy, but have a slight woolliness in the dark parts, and a want of sharpness in the finer details of the picture. These faults may, however, be owing to their having been printed from inferior negatives. Mr. McCraw writes to us: "C. B. has failed from over printing. . . . . . . One new feature in this process is, that these specimens have no glare on the lights where it might be objected to, the albumen only showing on the shadows, giving depth and brilliancy." We should feel obliged if Mr. McCraw would favour us with more minute instructions for obtaining pictures by his process, the information given in our fifth number being insufficient for any but very skilful photographers to follow with any reasonable chance of success.]

APPARATUS FOR FROTHING ALBUMEN.



Dear Sir,—I have used the above apparatus to froth albumen rapidly, and found it answer very well; at *a* can be placed a ferrule, so that the lower part can be taken off. The lower stick is cut into four portions, quills are slid in crosswise, and then tied in position. H. Hurst.

NEUTRALISING THE NITRATE BATH.

Sir,—Allow me to remind "*Perseverance*" (vol. i. p. 82) that he may convert his bath into the same state it was in before using the oxide of silver, by adding nitric acid, which will decompose the acetate, setting free acetic acid.

The oxide is a valuable agent when there is only a limited quantity of acetic acid present, but the insoluble nature of acetate of silver when present to any great extent, bars its employment. Ajax.

ANSWERS TO MINOR QUERIES.

Obtaining Stereoscopic Effect without Moving the Camera.—*Sensitive Sol.* The above effect can easily be obtained without moving the camera if the sliding front which carries the lens is made to move horizontally. The glass plate must be the size of the ordinary stereoscopic slide ($6\frac{3}{4} \times 3\frac{1}{4}$), and the lens must be so arranged that it can come opposite that part of the glass where the centres of the two pictures are intended to be. In this way only a lateral displacement of two or three inches can be obtained. If more be required the lateral range of the sliding front, and the length of the glass plate, must be proportionally increased, or the camera must be moved. (We cannot give the address you want.)

Simplicity of the Talbotype Process.—*H.* asks whether we consider the Talbotype process the simplest to work with, on a tour, without having the inconvenience of dark tent, &c.; and, supposing the tourist to be staying at an hotel, would the process be the most suitable as regards inconveniences of working, difficulties of obtaining water, &c.; also what materials

would be required to be taken from home in order to obtain good pictures with the least amount of trouble. We are decidedly of opinion that the Talbotype is the simplest and easiest of all the paper processes for the tourist. The plan given at vol. i. pp. 38, 51, may be followed, and the preliminary iodising and washing can be performed before starting. The final fixing and subsequent operations may also be left till the return—provided the gallo-nitrate developing solution be well washed off the picture with water, and then the sheet rinsed in a five-grain solution of bromide of potassium. This leaves only the *exciting*, *exposing*, and *developing* to be performed *en route*, and these are operations which may, by the exercise of a little judgment on the part of the operator, be easily managed at an hotel. The materials required are: the camera and its necessary accompaniments; a flat board, exactly the size of the negative paper, not too thick, and pannelled to prevent warping; a glass rod about as long as the diagonal measurement of the negative paper; plenty of blotting paper cut to the size of the negative paper (six sheets of the former to one of the latter); scales and weights; portfolio to contain the iodised paper and negatives, &c.; a gutta percha dish to wash the negatives in; a box containing the following chemicals:—one ounce of nitrate of silver, half an ounce of bromide of potassium, one ounce of glacial acetic acid, half an ounce of gallic acid, and half an ounce of cyanide of potassium, all in stoppered bottles; a four-ounce graduated measure, and empty bottles to hold the aceto-nitrate of silver, and solution of gallic acid. All these will be found to pack up very well together. The sheets can be rendered sensitive at night by candle-light (removed some yards off), and the day's work developed in a short time; and thus no cumbersome opaque and yellow cloths, for stopping up the windows, &c., need be carried about. Cleanliness is the chief point to be attended to, and the cyanide of potassium must be frequently used for cleaning the fingers and glasses, &c., taking care to well wash it off after use. We strongly advise all persons who intend trying this plan to have a few private rehearsals at their own houses before starting, as by this means they will be saved the annoyance of finding, at the last moment, some important trifle omitted in the travelling *matériel*.

PORTRAITS WITH A SINGLE LENS.—*J. A.* A single achromatic lens will answer for taking portraits if you have good light, and chemicals in perfect order; but, on comparing the results obtained with a single lens, and a double combination of the same focus, the portraits taken by the latter will appear to have more rotundity, and the figures will not seem jammed against the back-ground so much as those taken with the single lens.

LINES ON THE COLLODION PLATE IN THE DIRECTION OF THE DIPPER.—*T. H. U.* These are caused by your having employed a bath in which too much alcohol and ether have accumulated; either add its own bulk of a 30-grain solution of nitrate of silver, or place the bottle containing the bath (with the stopper out) up to its neck in hot water, as recommended at vol. i. p. 106.

WASHING OFF OF THE IODIDE OF SILVER IN THE BATH.—*A Correspondent* had an acid bath, this was neutralised with a saturated solution of carbonate of soda, and filtered; acetic acid was then added, until it just showed an acid reaction, and the result was a bath which produced the above effect. Our correspondent has, doubtless, added so much carbonate of soda, that there is not silver enough left in the bath. Only a few drops of a strong solution of carbonate of soda should be used, as the object is not to precipitate much silver, but only sufficient to carry down with it some of the organic impurities which may be in the bath. As a remedy, add some crystals of nitrate of silver. An over-iodised collodion *might* produce a similar effect; but, in our correspondent's case, we think it is the bath which is in fault.

FADING OF ALABASTRINE PHOTOGRAPHS.—Several correspondents having complained of the above, we have been induced to examine the subject more closely, and find that it can be avoided by allowing the mercury solution (vol. i. p. 81) to remain on the plate until the action has fully taken place. If the action be stopped before the full effect be produced, the pictures will be very liable to change.

INJURIOUS EFFECT OF GUTTA PERCHA ON THE SILVER BATH.—*Z.* has purchased a new gutta percha air-tight bath, and finds that it has communicated a fogging tendency to the contained solution. We have remedied this defect by filling our new gutta percha baths with a solution of cyanide of potassium (1 ounce to the pint), allowing it to stand for 24 hours, and then pouring off, rinsing well with water, and, finally, soaking for a few hours in water acidulated with nitric acid.

TO CORRESPONDENTS.

*** *Lessons on Colouring Photographic Pictures will be commenced in an early number. They will include Powder, Water, and Oil Colours, together with a few hints on the Harmony of Colours, and will form a complete and practical treatise on this important branch of the art.*

By accident the signature Θ was omitted from our valued correspondent's article on Positive Printing, at vol. i. p. 86.

J. C. S.—You have not added quite sufficient acid to your bath.

C. B.—Your only plan to tell if a lens is really made by the maker whose name is on the brass work will be to apply to him. We know of no private mark.

G. W.—Read the Report of the Experimental Committee of the Manchester Photographic Society, in this number of the "PHOTOGRAPHIC NEWS."

J. A.—We are much obliged by the information, but the articles on colouring, which we have in contemplation, will render it unnecessary.

PHOTO. KENT.—The "PHOTOGRAPHIC NEWS" is always published punctually at noon on Friday. There ought to be no delay in obtaining copies of the current number by the next post. *Very* many causes would produce that effect; either an alkaline bath, or insufficient acetic acid in the developing solution, are the most probable reasons for a stainy plate.

E. C.—Glycyrrhizine is not so well adapted for a positive as for a negative bath.

—— TEWKESBURY.—See the announcement at the head of this section. Take ordinary muriatic acid, and add bichloride of mercury, in fine powder, to it, in such quantity that no more will dissolve on shaking and standing for some time. We approve of your plan, and wish each subscriber would do likewise.

A. J. C.—Your questions do not admit of a decided answer, so much depends upon the mutual understanding between employer and employed at the time of engagement. You had better advertise in our columns.

A. C. M.—Application to some card maker will be the best plan to adopt.

WATERPROOF.—We do not think it can be purchased.

C. E.—1. It should have been "60 grains of nitrate of silver, and 4 or 5 drops of acetic acid, to the ounce." 2. Place the diaphragm *in front* of the lenses, and regulate the size of aperture by the appearance of the image on the ground glass. ¼ to ½ of an inch will be a good size. 3. A twin camera is better than one with a single lens.

C. C.—1. We are sorry we cannot assist you. Your best course will be to advertise. 2. Gutta percha is only very slightly soluble in collodion; put a strip in the bottle, and let it remain for a few days. We do not think it will do much good. 3. The ordinary bath.

ENQUIRER.—Your lens will do very well to begin with. To find the focal length, fasten a sheet of paper against the wall, opposite a window; hold the lens between the window and paper, and move it to and fro until an image of a distant object is depicted sharply on the paper. The measured distance between the lens and paper gives the focal length, sufficiently near for all practical purposes. Your other questions can only be answered by ocular inspection of a good camera.

G. H.—The fault is not in the fixing solution, but in some of the other chemicals; perhaps the bath is not acid enough, or the collodion not good.

FELIX.—Inquire at some well-known establishment. We are not in possession of the information.

Z.—One or two small specks in a lens are not of the slightest importance. Prints or pictures should be copied with a portrait lens, or a single lens made on *purpose* for such work. Perhaps some of the information on Fothergill's process, given in this number, may help you.

ARGENTUM.—Precipitate the silver from the liquid, by placing in it clean strips of metallic zinc. Collect the precipitate, wash it, and add it to the ashes of the silvered paper, and then proceed as recommended to T. Clark, at page 96.

PHOTO.—Has our correspondent tried filtering the bath, amongst "every means to remedy the evil"? That seems the most likely cause of the spots.

ARGENTUM (G. J. J.)—Cyanide of potassium is the best remedy for photographically-spotted shirt fronts.

Communications declined with thanks:—K. W.—Alpha—X. Y. Z.—Gregory H.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Printing Bath.—J. C.—W. H.—Farquarson.—G. R. S.—Querist.—W. K.—Ellen.—W. J. N.—E. B.

IN TYPE.—T. Barrett.—J. Nicol.—Euphos.—H. C. J.—J. C. S.—Sensitive Sol.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., NO. 11.—*November* 19, 1858.

APPROACHING EXHIBITIONS.

NO. II.

THE season for photographic exhibitions is fast approaching; and, judging from the reports which we have from all parts of the country, there is a likelihood of a greater number being held this season than at any time since the discovery of Photography. The exhibition of the London Photographic Society will be held in the Gallery of the Society of the British Artists, in Suffolk-street, Pall Mall. In our fourth number we took occasion to remark upon a somewhat strange resolution passed by the council of the Photographic Society. We did this the more readily because many photographers had addressed us on that point; and not having space to insert the numerous letters, we made the subject one of more special remark. Not only were "remonstrances" addressed to us personally, but, we believe, to the Council of the society, who then modified their resolution by announcing, that it was "not intended to exclude the works of our photographic brethren exhibited at the exhibition in Edinburgh, which opens in December." We were glad to perceive from the foregoing that the Council had seen the sense and justice of our remarks, and therefore we are not a little astonished at hearing what is tantamount to a repetition of the original resolution. They intend to abide by their former resolve. We cannot help differing from them in regard to their opinion, that the resolution is one "which is conservative of the dignity and professional interest of the photographer." In our fourth number we plainly showed that it certainly was not promotive of the photographer's "interest;" as, on that occasion, speaking of the resolution, we said, that "It seems to us to be a most effective attempt to defeat the object of exhibitions, because it will easily be seen, that to exclude a photograph from an exhibition simply because it has been exhibited in shop windows is a most arbitrary regulation, since many of our leading photographers have their respective publishers; and it is not likely that a publisher would so far forget his own *interest* as to withhold the publication of a photograph until it has been exhibited at the society's exhibition." Nothing can be more apparent, that it would not be promotive of the photographer's "interest" to keep a photograph until it was seen at the society's exhibition. The absence of novelty in the contents of the last exhibition, no doubt, called for a stringent regulation, requiring that no pictures should be re-exhibited in any subsequent exhibition; as nothing was more apparent, than that the exhibition conveyed very little of the "photographic intelligence" with which it is now proposed to cover the walls of the Photographic Society's exhibition. It remains to be seen with what amount of impartiality previously-exhibited photographs will be excluded.

We are glad that the exhibition at the Crystal Palace is to be reinforced with the collection after the Suffolk-street rooms close. We showed very plainly, in our review of the Crystal Palace Photographic Gallery, that it greatly needed something worthy of the place and the art. It has been suggested, that, at the forthcoming exhibition, an effort should be made to obtain a complete series of photographic engravings. This suggestion is well worth the consideration of those who may be appointed to superintend the exhibition; and it ought, we think, to be carried out in a similar manner to that in which the Manchester Exhibition was arranged, viz., chronologically. That was, probably, one of the greatest charms of that noble collection, as the art student was thus enabled to see and study the early works of the masters of each country where the arts had flourished, and continue his study of *chefs-d'œuvre* representing a space of many hundreds of years, in the gallery of ancient masters. While in the modern, or English school, there were specimens of almost every master of note from the time of its foundation. This arrangement was carried out uniformly in every department except the photographic gallery, where, we are sorry to say, not the slightest arrangement, as regards chronological order or the classification of subjects, was observed. This is to be regretted, as a great opportunity was thus lost of displaying the wonderful resources and progress of photography. In the present instance, the suggestion of forming a gallery of photographic engravings might be carried out with very little effort, by collecting the earlier attempts of Mr. Fox Talbot; the photo-galvanographic prints; the productions of M. Poitevin and other French photographers; and, lastly, some specimens of the more elaborate and beautiful photoglyphic process, which we have recently given our readers an opportunity of inspecting for themselves.

The Architectural Photographic Association open their exhibition in December, in the gallery of the Old Society of Painters in Water Colours, in Pall Mall. The display, we have reason to believe, will greatly exceed that of last year. We shall revert to this subject in a future number. The object of this association is to present to its subscribers a number of photographs of the finest specimens of architecture in the world. It is carried out upon the Art Union principle. The late exhibition was the first that the association has held, and hence the inexperience of its managers may account for some apparent irregularities which characterised their proceedings. The committee who had the management of the association had first to obtain subscriptions to a certain amount before operations could be commenced; and the advantages which were held out to the members were, that they would be entitled to a number of good photographs in lieu of their subscription. As they obtained a large amount of money, thus subscribed, in advance, the committee were enabled to contract with photographers for a number of copies of their photographs at a low price Taking into consideration probable expenses, a little additional charge was placed on the photograph, which was marked accordingly. The irregularity is as follows:—A visitor might enter the exhibition, and purchase a catalogue; he had then an opportunity of seeing whether there were really any pictures which he would like, and which would make up the value of his subscription *before he subscribed;* and, by this means, the stranger who saw before he bought, was placed upon a better footing than one who had some time previously subscribed in order to carry on the undertaking. Unless it is stated that this will be remedied this year, it will most effectually lead to the extinction of the society, as nobody will care about subscribing before he sees whether he can really obtain the value of his subscription; and thus there will be, eventually, no funds in advance with which to carry on operations. It is clear, that some decided advantage should be held out to the public in order to induce people to subscribe beforehand.

A reference to our advertising columns of last week would enable our readers to perceive, that the photographic society which has recently been formed in Nottingham, under the presidency of his Grace the Duke of Newcastle, contemplate

opening an exhibition about the 20th of next month. This society, during its short existence, has been carried on with some vigour; and we have no doubt that the first exhibition of the society will be creditable to them as a beginning.

PHOTOGLYPHIC ENGRAVING.

We observe that a contemporary has spoken in somewhat depreciatory terms of the invention of Mr. Fox Talbot, which we have been the means of bringing so prominently before the public. His objections to the process are not very clear, and appear to have been made before he had seen any proofs printed from plates engraved by the new process. He asserts that half-tones cannot be rendered except by the introduction of an aquatint ground, and that, therefore, to obtain a pure photograph in carbon from such plates, is an absolute impossibility. Such an objection appears to us to be hypercritical. What does it signify by what means the various gradations of light and shade are produced, since the result is a fac-simile of the photographic picture? We have before us a print—one of many hundreds which were taken from the same plate. The subject is, a view of that portion of the Seine at Paris which includes the floating baths, &c. In this engraving the half-tone is as perfect as could possibly be expected from a new invention, even by the most exacting photographer, and far more perfect than anything we have yet seen from a plate engraved by the heliographic process which had not been subsequently operated upon by the hand of the engraver. We select the plate in question, though we think it is not the best in an artistic point of view, because it furnishes the strongest evidence of the exceeding correctness with which the photograph is reproduced, even in its most minute details. For example, in the left-hand corner of the engraving there are the following words on the front of a house, which are invisible to the unassisted eye and yet distinctly visible on the application of a magnifying power:—"Caoutchouc vulcanise.—Secretan, opticiens;" and on the house near it the words, "Chevallier Ingenieur, opticien." It seems to us that this furnishes abundant evidence that the engraving is, to all intents and purposes, a fac-simile of the photograph; and it is not of the slightest consequence to the public how Mr. Talbot produces this result. It is enough to know that it is accomplished by chemical means at a small cost, and that the engravings obtained by it are unrivalled by any means employed hitherto. Of the probable advantages to be derived from the discovery we have already spoken, and it is not necessary, therefore, for us to go into that question again at present. When Messrs. Soulier and Clouzard have succeeded (and we have no doubt they will succeed) in obtaining a perfect glass positive of sufficient dimensions, we shall have the pleasure of offering our subscribers a plate which will remove all doubt which may exist as to the value and importance of Mr. Fox Talbot's invention.

FOTHERGILL'S PROCESS.

BY MR. J. NICOL.

In a recent number of the "News" you requested some information on "Fothergill's process," and, although the invitation has been responded to from one or two quarters, perhaps you may still find room for a few words from me on the subject.

I have tried almost every dry process that has been published, and many that have not been so, and consider Fothergill's much better than any of them. In my hands, at least, it is more certain, more sensitive, more easily managed, and more valuable than all the others put together.

After many experiments I adopted the following method of manipulation, and as a testimonial in its favour may state, that since its adoption I have prepared many plates for my own use, and many more for sale; and my own experience, and the reports of my customers, warrant me in saying that, with proper care, a dozen plates will always give a dozen good pictures. The very gateway of success is a suitable collodion. The pyroxyline I prepare by taking—

Nitric acid, S. G. 1·500	12 ounces
Sulphuric acid, Commercial, S. G. 1·845,	14 ounces
Water	3 oz. and 6 drachms

raising the temperature to 150°, adding the cotton gradually and allowing the action to go on for five minutes, then washing till every trace of acid is removed.

The collodion consists of this:

Pyroxyline	4 grains.
Iodide of cadmium	2 grains.
Iodide of ammonium	2 grains.
Bromide of ammonium	1 grain.
Sulphuric ether, S. G. ·750	6 drachms.
Alcohol, S. G. ·800	2 drachms.

My bath is made of fused nitrate of silver, and contains forty grains to the ounce. It is *very* slightly acid. With a neutral bath I have always found a want of brilliancy in the shadows.

I prepare albumen by taking

White of eggs (very fresh)	5 ounces
Distilled water	5 ounces
Strong solution of ammonia, S.G. ·882	½ drachm

This I put into a bottle, holding at least twelve ounces, and shake for about half an hour. In half an hour more it will be settled and ready for use. It will keep good for at least a fortnight, but when a few days old, should be filtered through sponge just before using.

So much for the material; now for the manipulation, which may be separated into five operations:

1. I coat the plate and sensitise in the usual way, and drain on blotting paper for half a minute.

2. Place it in a bath containing five grains of nitrate of silver to the ounce, move it about for half a minute, drain, and wipe the back with blotting paper.

3. Attach a pneumatic holder and pour on carefully (for stereoscopic size) three drachms of distilled water; keep this moving over every part of the plate for a few seconds, and pour off.

4. Pour on one and a half drachms prepared albumen, and cause it to flow backward and forward for a minute, making sure that it has been in contact with every portion of the surface before pouring off.

5. Wash off the albumen by pouring very gently at one end, and sliding the glass from corner to corner, four ounces of water, drain, wipe the back, and set up on blotting paper to dry.

The second bath may seem an unnecessary addition to the more general method of doing the whole washing at one operation, but in reality it is not so; the difficulty of getting the water to flow evenly over the plate just removed from the sensitising bath is altogether obviated, and the risk of unequal washing avoided.

The accompanying picture was taken two months ago, in forty seconds, in weak sunshine, on a plate five weeks old, with a single lens of seven inches focus and $\frac{5}{12}$ stop.

I have recently been experimenting with a view to drying by artificial heat, and, thinking it may be applied with advantage, have set about devising an arrangement for that purpose. It consists of a light-tight box eighteen inches high, nine inches deep, and eighteen inches broad. Three inches from the bottom there is a shelf of perforated zinc, supported on several cross wires, and covered with two or three plies of blotting paper. On each side there is a slip of wood with four notches two inches apart, intended to support four glass rods at a height of six and a half inches from the zinc shelf. Between the shelf and the bottom there is a steam-tight tin pan, two inches deep, and the full size of the box. The only opening to this is a tube coming through the side of the box. This is attached by a coupling to a tin tube which is attached to the tube coming from the still-head of an ordinary distilled-water apparatus; or, what will

answer just as well, the spout of a tea-kettle. The plates rest on the blotting paper, and lean with one edge against the glass rods, which should be movable, so that in commencing all but the last may be taken out and a fresh rod put in as each row is completed. Near the top of the box there should be a small shelf on which is placed a dish containing some quick-lime, which will absorb the moisture as it is driven from the plates. To complete the whole a thermometer bulb may be inserted through a hole in the top, and with a "bunsen burner," or even an ordinary gas jet placed below the still or tea-kettle, the temperature may be regulated at pleasure. By-the-bye I had almost forgotten a word about developing. Gallic acid gives the best picture, but it is so tedious in its operation that I have laid it aside. Pyrogallic acid is the thing, and I am at present most successful with

Pyrogallic acid	1 grain.
Glacial acetic acid	10 drops.
Alcohol	10 drops.
Water distilled	1 ounce.

In warm weather twenty drops of the acetic acid will be required, but at this season the retarding effect of such a quantity is too great.

I level and moisten the plate, and to six* drachms of the developing solution add four drops of solution of nitrate of silver, half a drachm to the ounce, pour on and keep it constantly moving. This will very often be found sufficient for the whole operation; but should it get dark and seem to be acting very slowly, or not at all after a time, it should be thrown off and a fresh quantity applied.

I fix with hyposulphite of soda, three or four ounces to the pint, and varnish with a solution of gum benzoin in alcohol.

Edinburgh.

P. S.—I should have mentioned that the measurement of the drying chamber is for stereoscope plates, and that with it four dozen may be dried at once.

PHOTOGRAPHY IN ALGERIA.

NO. III.—(*continued.*)

I was obliged to admit to myself that there was very little chance of my presence on the plateau being unknown, the presence of the horses, and their being tethered, would have told the thief that somebody must be in the neighbourhood, and there was no difficulty in the way of anybody seeing my tent from the wood without my seeing him; besides, he might have come close to the tent while I was inside without my being aware of it. There was one source of consolation, and that was in the thought that the thief might have no friends within reach, and might be so well satisfied himself with the spoil he had already got, as not to return. Of course I had not ventured out without that light revolver of Tranter's with which you are familiar. The sheikh had especially cautioned me on that matter; some of the Arab tribes looking upon it as an honour to take a man's life without the slightest provocation, and from precisely the same motive as inspired Cooper's noble savages in their hunt for scalps, whether of men, women, or children: the estimation in which such an Arab is held among his tribe being in proportion to the blood he has shed. But though I was armed, I had not the least inclination to take the life of any human being; on the contrary, the intense dread I have of giving pain to any living thing is such that I should be ashamed to acknowledge it to the people among whom I am now living; but I soon found the justice of the observation made by the French lady when the priest told her, with emphasis, that Saint Denis had walked two whole leagues with his head in his hand,—that in such cases "the first step is the only difficulty," as you will see.

If there had been a certainty of my reaching the camp in safety by walking, I would have hidden my camera, secreted my negatives in the best way I could, and have started off; but the chances of my doing so were very problematical, as some of the natives who had been dispersed by the French troops were pretty certain to be prowling about as near the camp as they dared, in the hope of picking off a straggler. It was already dusk, and would be dark before I could get clear of the wood, so I was obliged to give up that idea, and wait, with as much patience as I could command, for the return of the Arab, who I felt certain would be accompanied by the sheikh. As an additional means of sustaining my equanimity I did what every man who is accustomed to be much alone is sure to do—I filled a meerschaum, and commenced smoking. I was sitting inside my tent, which was partly open, my revolver lying on my knees, when I heard a report, and almost simultaneously there was a commotion among my teeth, and a jingling among my chemicals. The shock I received was so sudden, that, from some cause or other, probably fear, I did not stir; nevertheless, I had presence of mind to take up my pistol, and, in what was probably a few seconds, but which seemed to me a very long time, I saw the muzzle of a gun projecting from behind a bush, and then the figure of what appeared a naked man came cautiously forward in the direction of my tent. I was even at that moment undecided what to do; I did not like the idea of shooting him, and if there had been any hope of making myself understood by him, I believe I should have tried the effect of a parley. He came sneaking along—in this respect also resembling the *noble* savage—thinking, no doubt, that his shot had taken effect. The mouth of the gun was within a yard of my body, when, almost mechanically, I raised the pistol and fired. The gun fell to the ground, and I had just time to move my legs a little aside out of the way of the body when it fell heavily to the ground beside me. I was seized with such horror that I sprang up and ran off towards the ravine. Soon, however, other thoughts—thoughts as to my own safety—made me think with indifference on what had just occurred; so powerful is the feeling of self-preservation. From what I had heard of the manners of the Arabs, I knew there was a possibility of the man whom I had just shot being alone, and that he was the thief who had stolen the horses, and whose greed had induced him to return alone, that there might be none with whom he would have to share the plunder, thinking, probably, there would be little difficulty in shooting a man whom he might attack unawares; and certainly, if I had been sitting outside my tent instead of inside, where it was impossible to see me at a few yards distance, I should not now have the pleasure of writing to you, nor would you, or any of my other friends, have ever known that my bones were bleaching on a mountain in Africa. At the same time there was the knowledge that the recent defeat of the Arabs had scattered them about in the vicinity, for these men when defeated never go right away at once, but hang about the spot under shelter of the bushes and rocks until the victors have retreated, and there was every probability of the report of firearms bringing them to the spot. There was no way of escape open to me; the small bit of table-land on which I was, was bounded on one side by the deep ravine, the side of which was almost perpendicular, and, with the exception of two or three little shrubs at considerable distances from each other, offered no salient points for the hand or foot; and on the other by the thick trees, which inclosed me in a semicircle. My feelings, as I waited in the momentary expectation of an attack, were in truth indescribable, for I really do not remember what they were. I recollect that I felt an intense dread of dying, not so much, I fancy, at the thought of death and its consequences, as of the pain I must suffer before death.

My pen is not that of a ready writer, or I might describe what followed in the style of an author with whose works you are familiar, thus:—I placed myself with my back to the ravine, and determined to sell my life dearly. In that moment, with death staring me in the face, the image of the old

* For stereoscope plates.

house rose up before me, with my kind old father sitting beside the fire in the familiar room he called his study. There hung the well-remembered whip with which, when a boy home from college for the holidays, I had thrashed the biggest bully in the county. There, too, &c., &c., &c.

Or, perhaps, a graver style would be better suited to the occasion—dropping the first person and assuming the third, thus:—Darkness was spreading her sable wings over the earth, and the dazzling orb that bears the name of her who erst on Ida's mount received the golden apple, prize of the fairest, gentle Aphrodite, shone with a lustre unknown in colder lands and more cloudy skies. The bold and daring photographer (the real Prometheus, who seizes heaven's light and devotes it to his will) gazed at the lifeless corpse from which the soul had been divorced by his hand. A solemn awe stole over his spirit—the awe which the living feel in darkness beside the bodies of the dead; . . . . and so on *ad lib.*

Perhaps you may think I speak of the matter with too much lightness; but believe me I feel as deeply grateful to the . . . .

In plain language, what really passed was as nearly as possible as follows:—I prepared myself as well as I could for the encounter, which seemed more imminent every moment. I wished myself at home, or anywhere than where I was; and altogether I passed a "*mauvais quart d'heure,*"* before I distinguished six or seven half-naked Arabs creeping along through the bushes. It was very difficult to make them out, in consequence of the trees in the background; but one's eyesight, as well as some other faculties, are rendered much more powerful by peril, and certainly, I fancy, I was never much nearer death than at that moment. I lay perfectly still behind a bush, and watched their gradual approach to where I was concealed. At one time they drew together and held a conversation, and I began to entertain a slight hope that they were about to give up the search; but just then one of them appeared to draw attention to the tent, and there was a hasty move towards it. I guessed they had discovered the body; and a minute or two afterwards I was convinced of it, for one of them flashed some powder in a pistol, and set fire to a piece of rag, I presume for the purpose of examining the face. They were in the act of conferring together, when I heard the trampling of horses; and forgetting that these fellows might have companions on horseback, I concluded at once that it was my friend the sheikh, and jumped up from my hiding-place and moved in the direction of the sound, and was very near losing my life in consequence, for the natives round the tent caught sight of me, and there was a pretty general discharge of firearms. Fortunately I was not mistaken in supposing that it was the sheikh, who, together with his brother and three of his men, had come to seek me. There was a good deal of firing for two or three minutes on both sides, and my revolver was not silent during that period; but less mischief was done than I expected. On our side there was one man wounded, and on the other there was one shot dead, and another left on the ground unable to escape, and who, I am afraid to say, was disposed of quietly by one of the Spahis. My camera and the other apparatus was divided among the party, and I mounted behind Hamed *en croupe.* Of course I had to relate all that had taken place, and they listened to the tale with as much of coolness as if it had been a matter of everyday occurrence. In the matter of coolness I imitated them; but I made a resolution in my own mind—and I don't think I am likely to break it either—that if ever I accompanied another expedition, I would take care never to place myself in a similar position.

My first thought on reaching the camp was of my negatives. I opened the case, and—not to my surprise, certainly, for I rather expected to find something of the sort—but, to my great vexation, I found that the ball had cracked three of the negatives, and had finally lodged in the collodion bottle, the contents of which slightly injured some others. I think now that I have cause to rejoice in having saved any, and I hope I shall have the pleasure of seeing them at the Photographic Society's rooms, in your company, when I return to England—that will be some compensation for the peril I incurred in getting them.

Long before you receive this letter I shall be on my way to Hamed's douar. Whether I shall be able to send you a letter from there is doubtful; but if it be possible, you shall hear from me.

Remember me to . . . . , and if there is anything in this letter which strikes you as being egotistical, pray don't publish it. There is, as you know, nothing I dread so much as being even suspected of boasting.—Very truly yours,

C. A.

P.S.—If you know, or hear of, any photographer coming out here, will you endeavour to send me as much collodion of ——'s make as he will be kind enough to take charge of?

* For the benefit of our younger readers we may mention that "*un mauvais quart d'heure*" is an idiomatic French phrase, the meaning of which will be sufficiently evident from its literal translation—"a bad quarter of an hour."—Ed.

PREPARATION OF IODIDE OF POTASSIUM.

BY BARON VON LIEBIG.

One of the most ordinary methods of preparing iodide of potassium consists in mingling, by weight, three parts of iodine with metallic iron and water; then filtering the solution of iodide of iron which results, treating it with another part of iodine, and precipitating the iron with carbonated or caustic potash, when the solution is complete; at the same time a black oxide of iron deposits itself, and is washed with facility. This process, executed on a large scale, presents some inconveniences. The solution of the iodine, and its transformation into iodide of iron, is effected very slowly: the liquid must be heated, much water used, and the operation must be performed in a porcelain or glass vessel, because, if an iron one be used, the per-iodide changes rapidly into proto-iodide; and the purposed object, which is to convert the iron into magnetic oxide, is not attained. Now this difficulty may be overcome by a slight modification.

The iodide of iron is first prepared as above mentioned; but instead of dissolving the other third of iodine in the iodide, it is dissolved in a weak solution of potash; or, if it be desired to prepare the iodide of sodium, in dilute solution of soda, and by means of this solution the precipitation of the iodide of iron is proceeded with. The quantity of the alkaline solution should be a little less than would be required for the complete precipitation, which is concluded with a suitable dose of alkaline carbonate. The precipitate, under the form of a bulky voluminous mass, appears to be of a very unequal composition; but if left in obscurity, and frequently shaken, the protoxide unites perfectly with the peroxide, and forms the *magnetic* oxide, which by two or three washings is completely freed from the alkaline iodide. If, to form the iodide of iron only two parts of iodine instead of three be employed, and a third part be dissolved in the caustic alkali intended for the precipitation, hydrated oxide of iron is obtained, which is very fine and pure, and can be easily washed, though less readily perhaps than the magnetic oxide. Baron Liebig is of opinion, that this method will obviate the losses sustained by other modes of preparation.

THE STEREOSCOPIC ANGLE.

An extract which we made from the *Literary Gazette*, in vol. i. p. 15, on the "Stereoscopic Angle," has caused a discussion of some scientific importance in our columns. At vol. i. p. 98 appeared a reply to that extract by Mr. Lake Price, which called forth an able letter from a most eminent scientific gentleman, under signature of "J. F. W. H," p. 110.

In the last issue of our excellent contemporary there is a

reply to Mr. Price's letter, which we feel it right to extract, that we may put our readers in full possession of the discussion, as it is one which must be interesting to all scientific photographers. Our contemporary states:—

"In a review of Mr. Lake Price's 'Manual of Photographic Manipulation' (*Literary Gazette*, August 7), we took occasion to make some remarks on the subject of what are called Stereoscopic Angles. Mr. Price laid down the rule that, for objects beyond ten feet from the eye, the cameras used in taking stereoscopic views must be placed farther apart in proportion as the distance of the principal object increases. For a view, for example, in which a mountain was ten miles off, the cameras should be fifty yards apart. This rule, we said, was based on an erroneous principle; and we endeavoured to show that, whilst a greater appearance of relief would unquestionably be given by increasing the distance between the cameras, the only possible means of obtaining a strictly-faithful representation of any view or object as it would be seen by both the human eyes at once, is to have the lenses of the stereoscopic cameras about the same distance apart as the human eyes are. Our excellent contemporary, the '*Photographic News*,' did us the honour to transfer our remarks to its pages, and last week, after an interval of nearly three months, that journal contained a long letter in reply from Mr. Price, in which he says that he is 'quite prepared to maintain the statement that he made in his book.' It would be inconvenient, and, indeed, impossible, to carry on a discussion after any such fashion as this; but there is, in fact, no room for discussion in the matter. Mr. Price 'maintains' his former statement, and maintains something more, for he goes on to say, 'I maintain that if you attempt to give any stereoscopic representation of the sun THREE THOUSAND MILES or more (the capitals are his own) would not be too much for the cameras to stand apart.' But he does not make the slightest allusion to fidelity of representation, on which our remarks entirely hinged. We never doubted, but, on the contrary, expressly stated, that greater 'rotund effect,' as he calls it, would be obtained by the separation of the cameras. Our proposition was, that a strictly true representation could only possibly be obtained by having the lenses of the camera or cameras the distance of the human eyes apart, whatever the distance of the principal object might be. We admitted that, for particular purposes, scientific or otherwise, an exaggerated relief might be desirable; but we urged, in the interest of truth, that in such cases the stereographs should bear on them a statement of the fact. Mr. Price has simply misconceived the argument."

PHOTOLITHOGRAPHY.

Mr. W. E. Newton has taken out a patent for what is described as, "An improved process for producing photographic pictures or designs on the surface of stone or metals, so that impressions may be taken therefrom by the process of lithographic printing." We have not space for the specification, but we will sum up as briefly as possible its principal features. A lithographic stone, or zinc plate, is coated with a solution composed of 1 quart of water, 4 ounces of gum arabic, 160 grains of sugar, and a like quantity of bichromate of potassa. The stone thus prepared is kept in the dark until dry, and is then exposed in the camera, or the picture is laid upon it and printed upon it, by the action of light. The effect of the luminous action is, to render the gum almost insoluble. The stone is then washed with a solution of soap, the coating is readily removed from those parts which have not been acted upon by the light, the soap is decomposed on the surface of the stone, and a printing surface is formed: "the action of the soap being inversely proportionate to the extent to which the gum was fixed by the light." The stone thus prepared is washed with water, and when dry receives a coating of printer's ink from the roller, which, by uniting with the soap, gives additional body to the picture. When variations of light and shade are required, the surface of the stone is roughened, but this is not necessary when only blacks and whites are required. The specification is rather comprehensive, for it declares the proportions of the ingredients given above not to be rigid, while various substances, not decomposable by bichromate of potassa, may be substituted for the sugar; and the coating not acted upon may be removed by other solutions than that of soap. Nevertheless he will consider the employment of any of these processes an infringement of his patent.

This process has been in use for some time past by Messrs. Cutting and Bradford of Boston, U. S. The difference between this process and that of M. Poitevin, as described in the "Photographic News," vol. i. p. 106, is, that in the former the ink adheres to those parts of the stone upon which the light has not acted, whereas in the latter it adheres to those parts where the light has acted.

PRESERVATIVE PROCESS WITH RASPBERRY SYRUP.

The following letter appeared in the *Times* of Wednesday, the 17th inst. We may state that the reverend gentleman there mentioned is one of our correspondents, and a frequent contributor to the pages of the "Photographic News." We were in possession of all the information contained below some months ago, but as our success with the process was very uncertain, we did not consider it advisable to place the process before our readers, especially as the employment of so remarkably indefinite a compound as an article of confectionery seemed to us a step in the wrong direction.

"*To the Editor of the Times.*

"Sir,—The Rev. J. Lawson Sisson, who resides at Lausanne, and whose excellent 'turpentine-waxed paper' negatives are well known to photographers, has communicated to us a new 'dry' collodion process. As this process is certain and simple —even more so than the 'Fothergill' process, which you published some months since, and as the specimens we have seen enable us to say that it is unquestionably successful, we ask leave, through your columns, to give the following description of the manipulation.

"The plates which it is intended to prepare being properly cleaned, proceed thus: Have four dishes of the usual kind, in three of them put sufficient filtered rain water (distilled water would be better) to thoroughly cover a plate, in the fourth dish put about the same quantity of raspberry syrup and water, in the proportions of ¼ ounce of syrup to 3 ounces of distilled water. (The raspberry syrup, which there are chemical reasons for using, is that usually sold by confectioners.) Arrange the dishes side by side, the syrup dish being last. A plate is then coated and sensitised in the ordinary manner, and is put, film upwards, in the first water dish. A second plate is coated and sensitised, and when ready to be lifted from the nitrate bath, the first plate is removed to the second water dish, the second plate being put in the first water dish. A third plate is then prepared, and plates one and two moved on to the adjoining dishes; then a fourth plate is sensitised, and at this stage plate one is immersed in the syrup dish, and plates two and three in the second and third water dishes. After preparing a fifth plate, plate one is ready to be lifted from the syrup dish, and is then placed upright upon blotting paper, to drain and dry.

"In this order the process is continued, the time required for coating and sensitising a plate measuring exactly the time any other plate shall remain in one of the four dishes. The plates will keep as long, and, in use, are quite as sensitive as those prepared by any of the existing keeping processes; there are no blistering or albumen difficulties, nor is any special condition of collodion or bath requisite.

"Mr. Sisson uses the ordinary pyrogallic developer, merely, in the first place, putting for a few seconds a little water on the negative.—We are, sir, your obedient servants,

"*Nov.* 16." "Murray and Heath.

A New Property of Freshly-calcined Charcoal.—The solutions of silver in nitric acid, whether neutral or acid, and chloride of silver dissolved in ammonia, are easily decomposed by freshly calcined wood charcoal. The silver is soon seen to cover the charcoal in the most beautiful manner; it sometimes appears crystallised.—*Comptes Rendus.*

Photographic Chemistry.

NATURE OF THE METALS.

(Continued.)

Bismuth is a metal not used in photography as yet. Its principal use is in alloys, as it communicates fusibility to other metals. An alloy composed of 5 parts of bismuth, 2 of tin, and 3 of lead, can be used for taking impressions from seals, gems, and any hard-engraved surface. It is from an alloy of this kind, with the addition, probably, of a little mercury, that those spoons are made which, if used to stir a cup of very hot tea, surprise the holder by melting away.

Arsenic is a grayish-white metal, of a volatile nature; if thrown on red-hot charcoal it burns, and at the same time gives out a strong odour of garlic; the result of the combustion is a white-coloured oxide, commonly, though improperly, called arsenic. Somewhat similar to arsenic in some of its properties, is the new metal discovered by Sir J. Herschel, and named by him junonium, a description of which is given at p. 86, vol. i., of this journal. In sensitiveness to light, its salts equal any known substance; but further experiments are necessary before it can be known how far it can be rendered available for photographic purposes.

There are some other metals beside those we have enumerated above, but they do not appear to us, either in themselves or combined with other substances, to be available for photographic purposes. Indeed, some of those we have treated of are not at present used; but we have thought it advisable to describe them, as a knowledge of their composition may lead to the discovery of some method by means of which they may be rendered useful servants of photography. The discovery of Sir John Herschel, referred to above, as well as the application of the nitrate of uranium to the printing of positives, are arguments in favour of the course we have pursued.

METALLIC OXIDES.

We shall now proceed to offer a few remarks on the oxides. The oxides formed by the combination of metals with oxygen may be classed as basic, neutral, or acid. The *basic* metallic oxides are those which unite with acids to form salts; such are the oxides of potassium, calcium, sodium, and silver, which yield the salts of potassa, soda, lime, and silver. Each metal furnishes at least one base; that is, an oxide capable of uniting with acids to form salts. The *neutral* metallic oxides are those which have no tendency to unite either with acids or bases. The *metallic acids* are those which unite with bases to produce salts: thus the acids called manganic, permanganic, chromic, perchromic, and stannic, which are combinations of manganese, chromium, and tin with oxygen, give, with potassa, the manganate, permanganate, chromate, perchromate, or stannate of potassa, &c.

Oxides are reducible to their metallic state either by the action of heat, as in the case of gold, silver, &c.; or by the intervention of carbon or hydrogen, at a more or less elevated temperature; or by means of a metal which has a greater affinity for oxygen. Thus oxide of copper may be reduced by hydrogen, and water will be produced by carbon, and there will be a production of carbonic acid by iron with a production of oxide of iron.

Metals may also be abstracted from their sulphates, chlorides, &c.; thus the sulphate of silver, and the sulphate of lead, may be reduced by iron with the production of sulphate of iron, and it is on these reactions, and chiefly on that of carbon, that metallurgy is based.

Oxides may likewise be decomposed by sulphur, chlorine, phosphorus, &c., especially if the assistance of heat be called in; these bodies take possession of the metal to form sulphides, chlorides, phosphides, &c.

The oxides of the alkaline and earthy-alkaline metals are all soluble in water; they form energetic bases; they are: potassa, soda, lime, baryta, and strontia. All the other oxides are very nearly insoluble in water; the soluble oxides, and more especially soda and potash, have received the name of *alkalies*.

Salts are formed from the combination of acids and bases. Salts, of whatever nature they may be, whether oxygenised or not, present certain characteristics which it is requisite to know. They are almost all solid, and generally white; or, at all events, free from any decided colour. When they are deposited in a solution, they usually affect a regular form peculiar to them, which is termed the *crystalline* form. Some crystallise in water without combining with it; others, on crystallising, take up a certain quantity of water, which is termed *water of crystallisation*—the hyposulphite of soda, for example. There are some which absorb moisture from the air, as the chloride of calcium, and these are denominated *deliquescent*. Others, on the contrary, lose on contact with dry air the whole or part of their water of crystallisation, like the carbonate of soda; these are termed *efflorescent*. Some salts decompose under the influence of light, instances of which are furnished by certain salts of mercury, and the salts of silver.

(To be continued.)

Dictionary of Photography.

Acids and Alkalies (*continued*).—Acids attack and dissolve all metals with but few exceptions. The rapid and violent solution of silver in nitric acid, in the formation of nitrate of silver, is a familiar instance of this kind of action. In their most concentrated form nitric and sulphuric acids act violently on the skin, and all other animal or vegetable matters, producing instant destruction of it. Strong solutions of potassa or soda have scarcely less destructive action; and either of these alkalies readily attacks and dissolves the skin. They both have also the property of dissolving the glaze from the surface of the commoner kinds of earthenware, and, also paint from any vessel in which their solutions remain for any length of time.

The most remarkable property of these two classes of bodies, is, however, their great tendency to enter into combination with each other and form new substances, in which the peculiar and characteristic properties which distinguish both acids and alkalies in the free state are entirely masked.

If a red cabbage be cut up in slices, and then boiling water poured over it, the purplish liquid so produced will be good for trying a variety of experiments, which will serve to illustrate the various properties of acids and alkalies. Take some of this solution, and add to it a few drops of dilute sulphuric acid, the purple colour instantly changes to red. Now add to another portion a few drops of ammonia, and a green solution will be formed. If this latter solution be now added by degrees to the red liquid, the green colour of the first portions added will at once disappear, and the liquid will remain red; gradually, however, as the ammonia neutralises the acid, the red colour will pass into a purple, and at length will become of a clear blue tint, showing that all free acid and alkali have disappeared. On evaporating the liquid to dryness, a neutral crystalline mass of sulphate of potassa, formed from the union of the sulphuric acid with potassa, will remain. The term which is applied to this, and to all other compounds formed by the union of acids and alkalies is, a *salt*.

Besides acids having the characters of those which we have mentioned, and which are easily dissolved in water, there are some which are gaseous, such as carbonic acid: others are solid, but nearly insoluble in water, such as arsenious acid, the *arsenic* of shops. Others again are quite insoluble in water, such as silicic acid, or common flint. All these in chemical language are true acids, although, when insoluble, they can have no sour taste or acid reaction on vegetable colours. Chemically speaking, acids are bodies which are capable of combining with alkalies and forming salts.

All true alkalies are soluble in water. The *alkaline earths*, such as baryta, strontia, and lime, which greatly resemble alkalies, are slightly soluble in water, and communicate to it an alkaline reaction. The same property is also possessed by the oxides of lead and silver, but in a much fainter degree. The numerous class of bodies, *basic metallic oxides*, are, with the above exceptions, insoluble in water; but they are easily dissolved by acids with which they unite, forming *salts*, which, usually, are well defined crystalline compounds, such as nitrate of silver, which is formed of nitric acid and oxide of silver; sulphate of iron, which is composed of sulphuric acid and oxide of iron; acetate of lead, which is formed of acetic acid and oxide of lead. All these bodies, whether soluble or insoluble, which, uniting with acids, have the property of neutralising them and forming salts, are known under the general term, *bases*, which term includes the alkalies and alkaline earths.

ACID SALTS.—Many compounds which are called acid salts from their having an acid reaction to test paper (such as bisulphate of potassa), should more properly be considered as double salts, in which *water* acts the part of a base. It may at first sight seem strange, but chemists generally admit that water acts, in very many ways, as if it were the oxide of a metal; and hydrogen very much resembles a metal in its chemical characteristics. Bisulphate of potassa, therefore, will, according to this view, become a double salt, composed of equal equivalents of sulphate of potassa, and sulphuric acid, or sulphate of water as we must call it. Water is one of the weakest bases; in fact, it is only now and then that its basic characters can be recognised. There are, however, a few true acid salts: bichromate of potassa is one of this class; for, as it contains no water, it cannot be looked upon as a double chromate of potassa and water, but must really be considered as a compound of two equivalents of acid to one of base.

(To be continued.)

A Catechism of Photography.

CALOTYPE—*(continued.)*

Q. HAS the process, as originally practised by Mr. Talbot, undergone any modification?

A. The process has been improved as our knowledge of the science of photography has advanced.

Q. What was the original process?

A. The best writing paper of medium thickness was selected, cut to the proper size, pinned by two of its corners on a flat board, while, by means of a soft brush, the first solution was applied—the operation being, of course, performed in a room chemically dark.

Q. What was the first solution?

A. It was a solution made in the following proportions: 50 grains of nitrate of silver to 3 ounces of distilled water.

Q. After the application of the solution, how did the operator proceed?

A. The paper was allowed to dry; when thoroughly dry, a portion of another solution was poured into a shallow dish, on this solution the prepared side of the paper was gently and smoothly laid until thoroughly saturated, in which condition it was allowed to remain for a few seconds.

Q. What were the component parts of this second solution?

A. A solution of 250 grains of iodide of potassium in one half pint of distilled water. The addition of common salt was afterwards made, and found to be a decided improvement. The proportions were, 100 grains of common salt to 400 grains of iodide of potassium.

Q. What was the succeeding process?

A. After being allowed to saturate for a few seconds the prepared paper was hung up to dry. But it was necessary to remove every trace of the salt with which the paper had been saturated. This was done by floating it on a basin of pure water for ten or twelve minutes, repeating the washing once or twice in clean water, by which the soluble salts were separated, and a single surface of iodide of silver was left upon the paper. Thus prepared, the paper was thoroughly dried and put away for future use.

Q. What was it called?

A. Iodised paper.

Q. When the paper was about to be used in the camera, was any further process necessary?

A. It was. Two solutions, previously prepared, were mixed in equal quantities.

Q. What were these solutions?

A. The first consisted of 100 grains of nitrate of silver in 4 ounces of distilled water, with a sixth part of its quantity of acetic acid. The second solution was crystallised gallic acid in distilled water. When these were mixed, they formed gallo-nitrate of silver.

Q. What was done with this preparation?

A. It was rapidly and carefully washed over the surface of the iodised paper so as to give a perfect and even coating. The surface was then dipped into some water, drawn across it three or four times, and dried with blotting paper; it was then fit for use, either at once, or at some future time.

Q. Could it be placed immediately in the camera?

A. It could be placed in the camera while still moist, and could receive a very perfect impression, the length of time being regulated by the intensity of the light.

Q. Was the picture visible when removed from the camera?

A. Only very slightly: it had to be developed, which was done by the following method:—The sensitive surface was washed over with gallo-nitrate of silver, and exposed, at the same time, to a gentle heat. After a few seconds a negative picture was developed, and from this negative any number of positives could be taken.

Q. By what means were positives to be obtained from the negative?

A. A piece of photographic paper was placed in immediate contact with the negative and exposed to the light.

Q. What sort of paper was to be used for this purpose?

A. Fifty grains of common salt were dissolved in two ounces of distilled water. Into this the papers elected for the purpose was to be dipped and allowed to soak for some time; after which it was to be removed, and placed between blotting paper to dry. Ninety grains of crystallised nitrate of silver were then to be dissolved in an ounce of distilled water; with this solution the paper was to be washed, and afterwards thoroughly dried. It was then ready for use, and upon its surface, when placed in contact with the negative, a clear, well-defined, and beautiful picture could be produced.

(To be continued.)

Correspondence.

AN EASY METHOD OF OBTAINING PHOTOGRAPHS OF HIGHLY MAGNIFIED MICROSCOPIC OBJECTS.

DEAR SIR,—I now send you a description of the process by which I obtained the negatives of highly magnified microscopic objects, the proofs from which I inclosed to you. My apparatus is very simple. It consists of a Stanhope lens, a double combination portrait lens, with ¼ inch stop, and a large double camera made of deal, painted black, measuring about 2 feet 6 inches when drawn out, and about 11 inches square. It has focussing glass, and dark slide. A portion of the front of the camera is cut out, from the top nearly to the bottom, and grooves are attached beyond the sides of this opening for different fronts to slide down into a grooved stop. For the present purpose the front has a hole cut in the centre, which should be in the centre of the front of the camera, for the back part of the combination of lenses to pass through. Inside the large camera is a smaller one without a back, into which the lenses are screwed, the front

lens towards the focussing glass. This smaller camera must fit the inside of that part of the larger camera which slides in, so that it may be moved the whole length; and, as it will not quite fit the larger half when moved close to the front, a piece of black calico or cloth should be nailed round the edge, to keep out all light except that which passes through the lenses. It must also have a wooden screw at the bottom, to keep it from shifting when in the required position. The cap is not put on the lenses.

The Stanhope lens must be placed in a hole in the centre of a thick piece of gutta percha, cut the size of the back of the combination, and if the Stanhope lens is in a setting smaller in the centre than at the ends, by cutting the hole smaller than the ends, and passing a warm knife round the edge, the Stanhope lens can be pushed through, and the gutta percha pressed close round the middle of it, so that it will be quite firmly set when the gutta percha becomes hard. A broad piece of sheet India-rubber must be cut long enough to go round the brass of the back lens, and attached to the gutta percha so as to make an elastic cap; two strips of India-rubber must also be fastened at each end across the front of the cap, and placed above and below the Stanhope lens, so that the glass containing the microscopic object may, when passed through, be kept close up to the Stanhope lens. In passing the glass through these straps they must be pulled out a little, so that the glass may not scratch the lens, as the smallest scratch is greatly magnified. To prevent also the Stanhope lens from scratching the lens of the combination, to which it must go close when the cap is on, a piece of wash-leather should cover the inside of the cap, with a hole large enough for the *glass*, but not the mounting, of the Stanhope lens to pass. Having placed the object to be magnified exactly in the centre of the front of the Stanhope lens, and pushed the back part of the combination through the hole in the front part of the large camera, I place the cap with the Stanhope lens on it, and turn it towards the lightest part of the sky, or to the sun if shining. Then, by drawing out the camera, the magnified object appears on the focussing glass, which must be adjusted till the object is perfectly sharp and clear. The dark slide with the sensitised plate is then put in, and the sliding shutter drawn up. The exposure must depend on the light, and the transparency of the object. I find about a minute is sufficient if the light be good, and the object tolerably transparent, but less if the sun passes through the lenses. Some objects, such as the "section of the stem of the clematis," require short exposure, from the light passing through the holes of the sap tubes; others, as "the tongue of the bee," require longer exposure, being more opaque, and of a yellow brown colour. With some objects, as, for instance, "the flea," there is considerable difficulty, on account of the body being so much more opaque than the legs. If the negative is not as sharp as the object appears on the ground glass, there will probably be some difference between the visual and actinic foci of the lenses, and the right position for the plate must be found. I think this apparatus would be useful for examining the structure of the different samples of collodion; by placing a drop on the centre of the Stanhope lens, the structure is plainly seen on the ground glass. The collodion I use for this process is old, and gives a white creamy film after sensitising; 2 drops of pure glycerine should be added to each ounce. The silver bath is the usual 30 grain, *not* fused nitrate, as that, I find, is apt to make the negative very red and burnt if the light be powerful. The developer I use consists of—

Pyrogallic acid	6 grains.
Acetic acid	1½ drachm.
Water	8 ounces.
Alcohol	½ drachm.

Truly yours, T. Barrett.

[The remainder of our correspondent's letter, which will contain the details of an improved printing process, will be given next week.—Ed.]

PHOTOGRAPHY IN INDIA.

Sir,—On my return to England after a few weeks' absence, I am rejoiced to find the "Photographic News" in circulation. I lost no time in procuring the back numbers. It is, Mr. Editor, the very thing that was wanted; it is well calculated to promote photography, and I wish you every success. I practise photography a little when circumstances permit (my calling is rather an unsettled one—I am a soldier), but even we soldiers, you must know, sir, have a taste for the beautiful, at least, some of us, although we have been, at times, known to damage and totally destroy, in the most merciless manner, the figure after the Creator's own image.

Perhaps, Mr. Editor, the following extract from a letter I received some time back from a comrade in India may not be out of place in your columns, as it has reference to an instance of photography there; this letter was written in August last. The writer, after entering into some interesting details about the affairs in India, goes on to say:—"By-the-bye, Bob, you are a photographer—you will be interested to know that I was photographed out here the other day; I made one of a group of four, but I was quite ignorant of the matter until it was done.

"I was on out-post duty. I saw two of the native vagabonds dragging along a European woman, evidently against her will. I allowed them to pass, jumped out from my hiding place, took my rifle by the muzzle, hurled the butt end over my head, and, with a desperately-dealt blow, I levelled both the Indians with the ground; the poor woman fell with fright; she was not hurt, the firelock passing over her head (I was afraid to fire, because I could not shoot both the villains without hitting the woman), but she almost instantly regained her native courage. I was about to raise her, when she sprung suddenly up, and, pointing with her finger towards one of the ruffians, she reminded me where my attention should have been first directed. One of the villains had risen on one knee, and was grappling for the hilt of his sabre; I plunged my bayonet through his breast; he made a desperate leap, and fell to rise no more. I was in the act of turning to look to the other fellow, when I heard a wild shriek (a shriek of revenge), and saw something glisten in the woman's hand; in an instant the sabre of the other man had sunk deep in his own breast, when, with a hideous groan, he gave up the ghost.

"I was leading this heroic woman from the scene of slaughter, when a singular apparition stood in front of us,—this was a little, short, elderly man, dressed in white canvas; by him stood an object dressed in black,—this was a camera. 'You look surprised, young man,' said he, addressing me; 'I was on my way to take a view of yon old tree stump, under cover of which I saved my life the other day; but seeing you and this good lady contemplating the mortal remains of these two Indians, who, I suppose, have met with a deserving fate at the hands of some of our brave soldiers'—(I related to him what had happened; the old man congratulated the woman on her escape, and went on to say):—'Seeing you looking on these dead men, wondering (as I supposed) how, and by whom, they had been brought to that pass, I thought it was an interesting group, though not one of the pleasantest; so, accordingly I pitched my camera, and directed it upon you, and made use of the material I had in readiness for my friend the old tree.'

"This photographer was armed with a long sword, a six-barrelled revolver, and a sharp-pointed knife about ten inches long. I gave him my name; he called on me the next day, and produced a view of the scene I have attempted to describe to you, viz., myself, the woman, and the two dead Indians, with the most astonishing fidelity.

"Yes, Bob, I can assure you that the camera does its share in recording the deeds of our brave countrymen here, ay, even in the battle-field."

I see an account of a singular phenomenon said to have taken place in France—that of the man's face being seen on the pane of glass, or, rather, the shadow of his face, after his

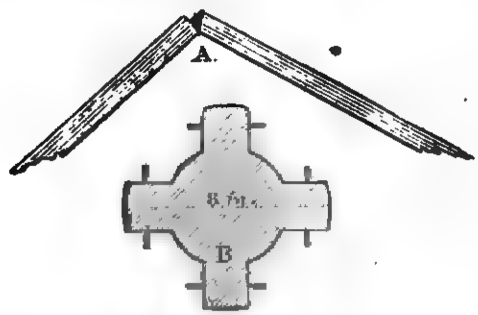
decease. A similar circumstance I witnessed a few years back, when stationed at Hythe, in Kent. A comrade of mine had paid a visit to Lympne castle, or rather the remains of it; there he picked up a piece of porcelain, on which were plainly to be seen the most perfect details of this old antique building; the walls and the ivy, &c., surrounding them, being in their true colours, though rather faint. I took this beautiful piece of nature's own painting in charge, being convinced that it was such, as these details never could have been traced by the hand of mortal. At the end of the first day there was no visible difference in its appearance, but at the end of the second day it became much fainter, and at the end of the third day it had nearly disappeared, and, finally, on the fourth day it was quite gone.

This, Mr. Editor, is a phenomenon that deserves the fullest investigation. R. W.

Croydon.

PORTABLE TENT.

Sir,—Persuaded that the uncertainty existing in all the dry processes as to the ultimate value of the embryo picture, would alone prevent them from becoming more than *derniers ressorts* of invalid amateurs, or from the encumbrance of unwieldy apparatus, I have ventured to encroach upon your space with the description of a tent of my own construction, possessing some advantages, be it said with due deference, beyond those already noticed in your columns.



Each of four triangularly-planed deal rods, 7 feet in length, and $1\frac{1}{4} \times 1$ inch diameter, is divided in half, and at the division a hinge screwed as at A. Then from one extremity of each of the jointed limbs, saw a cut to within 8 or 10 inches of the hinge. This will allow it to expand, and clasp, within transverse holes at the top, the iron studs fixed in the tent-top (shown at B). It will now be perceived that, by the removal of the lateral elastic pressure from the projection, the central piece may be removed with facility, and the legs folded and packed with those of the tripod. At the lower extremity of each support I have introduced a 3-inch earth-spike; but its insertion is rarely required, except in such boisterous weather as would be incompatible with landscape photography; and this addition may be dispensed with. The tent-cloth may then be wrapped around all, and secured by a leathern strap. In this state it is very portable. The cloth (black and yellow calico in my own) is sewn together in vandykes, one of which serves as an entrance, and is kept in tension by a slight weight, for the exclusion of light. The number of yards necessary may be easily calculated, as the surface of a cone, whose base is 6, and side 7 feet.

This construction of tent precludes the necessity of pins, fastenings, and central pole, inconvenient adjuncts to the one at p. 69; and combines facility of erection with unusual rigidity. Its size enables the operator to manipulate the largest plates with ease, or to shelter himself and apparatus securely from a summer shower.

Surmounted by a wooden acorn or *fleur de lis*, its appearance is far less objectionable to the artistic eye than the black canisters, or Brobdignagian kettle-drums, otherwise yclept tents.

Trusting these hints may be useful to numerous tent seekers, believe me to be, sir, yours very truly,

Shapscombe. Euphos.

THE PHOTOGRAPHIC SOCIETY.

Sir,—Allow me to point out an error which you have made in the admirable and succinct account which you gave in your ninth number, vol. i. p. 101, of the Proceedings of the Photographic Society. It is, however, one which I myself laboured under, until I was informed of it by a gentleman who had obtained correct information.

You proceed to notice a specimen of Compositive Photography, which, in a steady and consistent manner, you seem to think "scarcely applicable to photography," and which has earned for yourself and others the title of "ill-tempered art critics." The specimen was one by Mr. H. Robinson, of whom you have frequently spoken fairly and impartially, and whom, by the way, you again notice favourably in that article. The photograph which you have condemned was a damaged picture, exhibited for the purpose of showing the importance of early fixing after printing. The peculiarity to notice was, that the impressions first printed upon the sheet, and which were, consequently, kept the longest before fixing, were decidedly inferior in vigour and brilliancy to those last executed upon the same sheet. Hoping that you will insert the above, I am, sir, yours obediently, C. T.

[We regret that, owing to press of matter, we were unable to insert the correction which our correspondent has so kindly pointed out. The notice which we wrote on the occasion was necessarily hurried, as it had to be written a few hours before going to press. We, however, take this opportunity of observing that, under the circumstances, we were quite justified in making the remarks we did make. For all that we knew, it was a "simple first attempt of a novice in this art." If gentlemen send photographs illustrative of any point in photography to be inspected at the Society's rooms during the monthly meetings, they ought to accompany such pictures with description. Or, if they do not, it is at least the duty of the Secretary to see that the matter is attended to. There were many present, besides ourselves, who were puzzled at the picture, and who were at a loss to conceive the object of its exhibition. Under these circumstances, the remarks which we made were perfectly justifiable.—Ed.]

Photographic Societies.

Photographic Society of Scotland.

The first meeting of the season of this Society was held on the 9th inst., in George-street Hall; Mr. Scott Elliott, of Arkleton, in the chair. There was a pretty numerous attendance. The chairman intimated that they had secured a room at Mr. D. Hay's establishment, where their annual Exhibition would open in the beginning of December, and they hoped to get sufficient subjects to fill the room. He then adverted to the loss the Society had sustained, since its last meeting, in the death of M. Ivan Szabo, and he suggested that the meeting should record on the minutes its deep regret at the occurrence, which had severed from them a most distinguished member. The secretary then read a letter showing that a large number of negatives and positives (the property of M. Szabo) were still on hand, and that the deceased gentleman's executors desired to dispose of them. The secretary also stated that an opportunity offered itself for any members of the Society subscribing towards a fund for the erection of a monument to M. Szabo's memory which had been projected. Mr. Kinnear then exhibited some specimens of a new process of printing discovered by Mr. Pouncey, which was said to be perfectly permanent. He also showed some new stereograms from prints by Mr. Sang. Mr. Colin Sinclair had sent some new pictures, which had a peculiar effect in the stereoscope, and these he would hand round for the inspection of

the members. Mr. Moffat exhibited a photograph from a large drawing done by the usual process of lithography, upon a principle which at present was a secret. It was taken from an "auditory print," but the process was not that of cutting out the various figures and placing them in proper positions, but it was completed on some scientific principle, which he was not at liberty to explain. Mr. Moffat then exhibited a specimen of an Improved Stereoscopic Cabinet, which contained fifty slides; and by movement of a lever the slides one after the other were rapidly presented in the stereoscope. No less than 150 slides could be placed in the cabinet, which had several drawers to hold them. The cabinet was inspected by the members, who praised the ingenuity of the inventor. There were no other subjects of interest before the Society.

Paisley Photographic Society.

The monthly meeting of this Society was held in the School of Design, on Thursday evening, 28th ultimo; the vice-president, Archibald Barr, Esq., in the chair. A paper was read by William Stewart, Esq., School of Design, on "The Artistic Qualities of Photographs." In demonstrating the qualities of a good picture, Mr. Stewart showed how defective in some of these qualities a photograph must necessarily be. Photography is a purely mechanical art. The photographer must take nature as he finds it. He has not always the power of choosing the best point of view, nor can he increase the artistic effect by altering the arrangement of objects in a landscape, or by introducing fresh objects. The art is, therefore, better adapted for copying than composing. Much may be done by a judicious selection of subject, and the choice of the best possible point of view. Transcripts of near objects, such as rocks, stumps of trees, or architectural subjects, are admirably adapted for the camera, and it is here photography must find its legitimate field. The sharpness of the tracery in a Gothic window, or of the detail in a mass of rock, or the bark of an old tree, excites our wonder and delight. In a photograph, on the other hand, embracing near and distant objects, it is difficult, if not impossible, to preserve the necessary harmony. If the foreground be distinct, the distance will probably be lost; while again, if the distance be preserved, near objects will be a dark and unsightly mass. The want of sky in most photographs is also a very serious defect. The following rules of composition, which should be observed in taking photographs, were given:—(1.) A picture should contain variety of form, and broken line, as opposed to uniformity of shape, and continuity of line. (2.) There should be an object or group of objects as a principal mass, to which all others should be subordinate; it should not be in the centre of the picture, nor isolated, or unsupported by others. (3.) Lines should not join, so as to form a continuous vertical or horizontal line. (4.) The foreground should be proportioned, and broken by diagonal lines. The force of Mr. Stewart's remarks was well illustrated by numerous examples, and several photographs by the members were submitted to a searching criticism. A hearty vote of thanks was awarded Mr. Stewart for his interesting and instructive paper.

Photographic Notes and Queries.

TO CONVERT POSITIVES INTO NEGATIVES.—DRY COLLODION PROCESS.

Dear Sir,—Many people seem very glad that you are come before them again in the form of editor of the "Photographic News," a paper, by-the-bye, much wanted, especially in its chemistry, dictionary, and its catechism, which is the very thing to enlighten the ignorance of us photographers, who pour on the collodion, immerse, expose, and develop, &c., because we are told to do so in some cheap work that has fallen into our hands, and not possessing the slightest information as to how or why the beautiful results follow the simple application of the several liquids. So, as many persons are glad at your reappearance, so am I, not because it is you, but because of the good paper you are editing, to which I wish every success; for I do not know you, unless you are the latter of "Messrs. Spiller and Crookes' nitrate of magnesia process,"* which is a process I have done some nice things with, although, at first, I did not care about trying it, as I had a great dislike to magnesia, never having seen it but in one form, when a small boy—nasty dry stuff they called carbonate of magnesia, and compelled me take at certain periods, like the brimstone and treacle days of Dickens' school in Yorkshire. But perhaps you may want to know who I am. Well, I will tell you. I am a native of Exeter, consequently a "Devonshire dumpling." Don't imagine that I am a short-necked creature, warranted to go off at a moment's notice, like the stopper of a collodion bottle in the sun; no such thing. I am slight and ill-formed, very much like a dry bean pod—crooked and bent, and far from being dumpling-like. I still am, and ever have been, very restless—always where I was not wanted; something like what many photographers have found the filmsof collodion to be when practising the "dry processes"—everywhere but in the right place. Now I can photograph a little, and have been able to do so for some years. I commenced when very small. My first attempt was after seeing my sister use some nitrate of silver to mark linen with; so having watched where she placed the bottle, I daubed my apron with it, and stood in the sunshine watching it gradually becoming darker and still darker; *in* doing which I received great pleasure—but *for* doing which a great reward, for father used active means in the bestowing of it. Then I had a camera obscura, and some bi-chromate of potash. Oh! how I watched to see the form of some house the other side of the street on my paper, after several hours' exposure, and how happy I felt if a faint trace remained after washing: and so I have gone on; and now I wish to give you a few words on two things much wanted. The first, how to convert a positive into a negative, and the second about dry collodion, both of which I can answer for. The inclosed impressions will give you some idea of the results of each.

1. *To Convert a Positive into a Negative.*—First moisten the plate with distilled water; then set the plate on a level stand; pour over it water, 1 ounce, tincture of iodine, 10 drops; let remain three to five minutes, until the positive, when the solution is poured off, is of a greenish-yellow colour; then wash well with rain-water; pour off and on, in bright sunlight, until sufficiently intense, a mixture of 1 ounce saturated solution of gallic acid and 15 drops of a 30-grain solution of nitrate of silver; then well wash, dry gradually, and varnish. I have tried all the thickening processes that have been published, but none are equal to the above for certainty of results. It is needless to mention that great care is requisite in washing.

2. *Dry Collodion.*—Much has been, and is being said, about Fothergill's process. Now, it appears to me, that it is a step in the wrong direction, inasmuch as it is very slow. What we want is, rapidity of action. We want to be able to introduce figures into our landscapes; for a figure or two, well placed, will make many an otherwise uninteresting subject, a gem. I have taken some with a ½-inch diaphragm and 4½ inch focus lens on a plate, 36 hours after preparation in sunlight, in 35 seconds. The one marked No. 1 was taken in 45 seconds. In the left corner of the left-hand picture you will perceive the figure of a boy who was there, and I did not observe him at the time. It will give you some idea of its rapidity. No. 2 is the same length of exposure. In the right-hand picture you will perceive, on the ground, indistinct patches: it is the result of persons passing slowly or standing in the way. No. 3 is a thickened positive of Lynmouth. The following is the plan I have pursued for three years past. First, to make collodion fit for it, take—

Ether	5 drachms.
Alcohol	3 do.
Pyroxyline	5 grains.
Iodide of ammonium	5 do.
Bromide do.	1 do.

Let them remain for 24 hours after mixing. Pour off the

* Quite correct.—Ed.

clear portion; add, whilst warm, a quarter to half an ounce of common table salt well dried in the oven; shake it occasionally for two or three days. The object of the salt is, to absorb as much water as possible, as it is a far better plan than re-distilling alcohol from potash. When clear it is fit for use, although it improves by keeping. Sensitise as usual. On removing from the bath, well wash, as on this depends the keeping quality. I shall not say more on the advantage of well washing, as so many have shown its necessity. Place on a pad of blotting paper, inclined against the dark box, film side towards the place it rests against. They take 12 to 20 hours drying; expose and develop with saturated solution of gallic acid. I have kept them eight or ten days. ONE OF DEVON.

SPIRIT VARNISH TO BE APPLIED WITHOUT HEAT.—FORMULA WANTED.

SIR,—I have looked anxiously over each number of the "NEWS" in the hope of finding a recipe for making a spirit varnish that could be used without heating the plate, but in vain.

During the summer, and often at other times, I find great difficulty in obtaining heat of fire for varnish; and I therefore think, that could a spirit varnish be made that could be used cold, and would dry rapidly, *transparent* and hard, a boon would be conferred, especially on amateurs. I have experimented in this direction a good deal. If you pour spirit varnish on a collodion plate without heating it sufficiently, it dries a dense white opaque colour, totally unfitted for negatives. True, you can get a very excellent varnish which can be used cold, dries clear and hard, and very rapidly—benzol and gum dammar; but for positives it possesses a grave defect, inasmuch as the solvent of much of our black varnishes is turpentine or naphtha—which reacts upon the benzol, and the whites consequently suffer.

Again, I have prepared chloroform varnish, which can be used without heat, dries rapidly, hard, and clear; but although methylated chloroform can be got for 2s. 6d. per lb., it is only the one half in bulk compared with methylated spirits.

Now, sir, having hurriedly given you some of my crude trials after perfection, may I fondly hope that some of your able correspondents, failing yourself, will be able, in an early number of the "NEWS," to furnish a recipe for a spirit varnish possessing the requisites I have mentioned?

LUCIUS VERITATUS.

[Several excellent recipes for spirit varnishes have already appeared in our columns. We are afraid that the problem of which our correspondent requires the solution is not a very easy one; but as the information would be of great value, and possibly some of our correspondents may be clever in such matters, we have inserted the above request.]

CONSEQUENCES OF APPLYING HEAT TO THE SILVER BATH.

SIR,—Your correspondent, "J. W. Whelan," at vol. i. p. 106, has given, as I believe, correctly, the first part, but the first part only, of the answer to your question, as to the wavy, muddy-like lines, occurring occasionally on a collodion plate. He suggests that the ether accumulated in the bath from many plate-dippings is the cause, and that the ether may be removed by applying gentle heat to the argentine solution.

This is good so far as it goes, but, in my practice I have not found it to go very far; or, in other words, I could never make many good pictures with a bath after it had been so corrected. Why? For a long time I did not know. For although the acid reaction was renewed exactly as before, and the overdosing of the bath with iodide, by the frequent plate-dipping, was also corrected (by adding distilled water, filtering, and then giving more nitrate of silver), still the bath, or rather the collodion plates dipped in it, was slow as well as bad in action.

What was the reason of this? Looking at the bath formula, that immediately suggested that some of the *alcohol* must have evaporated, together with the ether, when the heat was applied to expel the latter. Alcohol was accordingly added, and at once and immediately the action of the bath immensely improved.

But, as to *how much* alcohol ought to be added after each successive re-heating of a bath in frequent use,—I cannot give good advice.

My best thanks to "S. M." and yourself for hints on "Fogging," at vol. i. p. 95.

Edinburgh, November 12, 1858. C. P. S.

EMPLOYMENT OF A CAMERA AS A MAGIC LANTERN.

SIR,—There is a letter in your last number on the employment of the camera as a magic lantern. Your correspondent has failed, it appears, to obtain satisfactory results, though he closely followed your directions given in a preceding number. The cause of his failure, as you state, is undoubtedly *want of light*. If, in addition to the "bull's eye" and "concave" reflector, your correspondent were to use, not a common argand lamp, but an argand having a *jet of oxygen* gas passing through its centre, and a small *ball of lime* suspended in the flame, I undertake to say that he would, in more senses than one, achieve a *brilliant success*.

I am but partially acquainted with the *practical details* necessary in employing the above mode of lighting a magic lantern; and my object in addressing you is to solicit the instruction I am in want of. It would be a gratification if you, or some of your correspondents, would give an article on the subject; and, as the winter evenings are now with us, if you would do so without delay.

As to the *expense* which such a lamp involves, it is, I believe, but slightly greater than that connected with an ordinary lamp; and even if otherwise, three or four photographers in a locality might unite. S. E.

GLASS POSITIVES IN LOCKETS.

SIR,—Your correspondent, J. F. M., at vol. i. p. 107, puts E. M. and others up to a means of overcoming the difficulty of cutting glass for lockets without injuring the pictures; but, at the same time he necessitates another difficulty, viz., guessing the focus; but this can easily be remedied. Take a piece of glass, of the same thickness as that cut for the locket (or a trifle thicker, to allow for the gutta percha cement), the size of the holder, and cut a square piece out of the centre large enough to admit of the glass cut for the picture; place this in the carrier in front of the glass holding the prepared piece, and, as a matter of course, it will be in the right focus. R. W.

Croydon.

NON-REVERSED GLASS POSITIVES.

SIR,—Take a plate of glass, the size of the plate you are going to use, and cement a small piece of glass upon each corner. Then put the sensitive plate, collodion side uppermost, into the dark slide; place the plate with the pieces of glass on the corners upon it; put down the shutter, and proceed as usual. In focussing, allow for the thickness of the glass plate. J. S.

ANSWERS TO MINOR QUERIES.

TONING GLASS TRANSPARENCIES.—*H. S. N.* objects to the colour which glass transparencies usually have when printed by the collodio-albumen or Fothergill's process, and wishes to know how the colour can be improved. Make a solution containing a few grains of sulphide of potassium, or a few drops of sulphide of ammonium to the ounce of water; pour this on and off the wet plate (just after fixing and washing), and the tint will quickly change to a rich dark colour. The operation should be

performed in a good light, and with a plentiful supply of water close at hand, so that the excess of sulphide may be washed off as soon as the desired tint is reached. After washing, dry the plate as usual.

MICRO-PHOTOGRAPHY.—*Rostha* inquires how the small photographs are produced which appear but a spot to the naked eye, but, when viewed through a microscope, are seen to be perfect pictures. The chief requisites for the production of this kind of picture are, a good compound microscope, and a collodion giving a perfectly structureless film under a high magnifying power. Incline the body of the microscope until it points horizontally, and place it at one end of a stout, firm table, the object-glass pointing outwards; remove the eye-piece, and allow the open tube of the microscope to point along the table. Exactly opposite, and about 3 or 4 feet off, arrange the negative on a frame, so that its centre shall be in a line with the axis of the instrument. Remove the stage, and, in its stead, arrange a frame of wood, with silver or glass corners for holding the focussing glass, or collodion plate, so that, by means of a spring, the ground surface of the focussing glass, and the sensitive surface of the glass plate, will always be pushed up to the same plane. Place a powerful lamp at a little distance behind the negative, and arrange a bull's-eye condenser so that a uniform brilliant light is thrown on the negative. This is best managed by placing a sheet of paper temporarily in place of the negative, and adjusting the relative distances of lamp and condenser until the paper is uniformly illuminated to the required size; then insert the negative, and having screwed an inch object-glass on to the instrument, move it to and fro by means of the coarse adjustment until an extremely diminutive image of the negative is apparent sharply defined on the focussing glass. The focussing should be performed with a magnifying glass, and when the best *optical* focus is obtained the real chemical focus should be arrived at by increasing the distance between the sensitive surface and the object-glass, by means of the fine adjustment, and taking several pictures at different distances until the position is ascertained, which yields the sharpest results; that position once ascertained, a mark should be made so that the exact spot can be at once ascertained. It must be remembered that the above alterations are for distances not exceeding a few thousandths of an inch, so the greatest care will be required not to overshoot the mark. The position of the large negatives must not be altered, as the adjustment of the focus would thereby be deranged; but, of course, any other negatives can be substituted, provided they are placed at exactly the same distance from the instrument. The best glasses whereon to take the pictures are those which are prepared for microscopic slides, made of the best thin plate with their edges ground smooth. Some discs of thin microscopic glass should also be procured for the purpose of being cemented with Canada balsam over the finished picture in order to preserve it. The great difficulty in these operations is the collodion: it should be rather thin and feebly iodised, and, of course, perfectly structureless; and any of our correspondents who can instruct us in the way of preparing a collodion which will admit of the image being examined with a compound microscope without showing a granular appearance or reticulation, will confer a boon, not only on us, but on all persons engaged in the art. The other baths and solutions may be the same as in the ordinary negative process.

ENCAUSTIC FOR POSITIVE PRINTS.—*S. W.* wishes to know if a slight gloss and vigour can be given to positives on unalbumenised paper by any after-treatment. *S. W.* objects, however, to that glazed with albumen as being *vulgar*. We have employed the following plan with advantage when mounting prints on plain paper:—Make a mixture of 1 ounce of white wax and 6 ounces of Venice turpentine; add to this sufficient spirits of turpentine to bring it to the consistency of cream. Mount the proofs on a piece of card, and when quite dry rub the above mixture over the surface with a piece of flannel; the pictures will be seen to be much improved, and the shadows will appear more vigorous, whilst a softer tone will be communicated to the whole picture.

PRINTING FROM A CRACKED NEGATIVE.—*F. Williams* has a valuable negative which, owing to its having been screwed too tight in the pressure frame, has a crack running about half way across the figure. On printing from this the *crack* is reproduced, with exaggerated distinctness, as a broad, white line edged with black. This evil can be remedied in great measure by placing a sheet of fine white paper outside the pressure frame close to the glass. The diffusion which this causes to the light prevents a shadow being thrown from the crack in the negative on to the prepared paper.

TO KEEP POSITIVE DEVELOPING SOLUTION.—*J. S.* The positive developing solution, for which the formula was given at vol. i. p. 12, will keep good for six months, or more, if the stock bottle is not opened more than once or twice a week. The bottle should be kept well closed and turned upside down, resting on the cork so that no air can get in.

COPYING CAMERA.—*A Subscriber.* The dimensions of a copying camera entirely depend upon the focal length of the lens you wish to employ; that being known, a few experiments, aided by a geometrical diagram, will at once give you the information wanted. If you use a portrait lens the front of it should be turned *towards* the negative, if it is to be reduced; but *away* from it if it is to be magnified. The distance between the lens and the picture to be copied, or between the lens and focussing glass, may vary from the focal length of the lens to infinity, according to the size of the reproduction required: the nearer the lens is to *one* the further must the *other* be removed.

TO CORRESPONDENTS.

*** *Lessons on Colouring Photographic Pictures will be commenced in an early number. They will include Powder, Water, and Oil Colours, together with a few hints on the Harmony of Colours, and will form a complete and practical treatise on this important branch of the art.*

W. D. B.—Your fault is over exposure. We have seen some tolerably good prints by Mr. McCraw's process, as mentioned in our last number.

DARKIE.—We cannot answer such questions. Send us a full statement of your difficulties, and we will help you; but we cannot undertake to find your difficulties out for you.

B. POSITIVE.—Your bath was not made with good chemicals. Your best plan will be to reduce the silver from it, and make another bath. An achromatic meniscus lens is the most proper kind for landscape purposes. 4. No. 5. The developing solution is wrong. 6. Sitter to face the north.

PAUL PRY.—1. One to five guineas per pair, *if good*. 2. They would be admitted, if worthy of a place, even though you are not a member. 3. We fancy the collodion is in fault. Try another sample, and, if that acts the same, make a fresh bath. 4. It need not be re-iodised, but will not be quite so sensitive as at first; it will, however, do well for out-door work. We shall be very pleased to see your pictures.

J. S.—We have not been very successful with the varnish described by Kit. Sil., p. 71, but have obtained better results by following the plan recommended by Sphynx, at p. 106. We wish we could inform our correspondent how the excellent and durable varnish made by Soehnée Frères is prepared.

R. W., Croydon.—Either the silver bath is too acid, or the collodion is made with bad pyroxyline.

E. S. H.—The experiments you wish us to undertake respecting the samples of paper, would occupy far too much of our time for us to spare, if the information is intended only for our correspondent's benefit.

A KENTISH MAN.—1. Try the process in vol. i. p. 86. 2. The exciting bath for positive albumenised paper always gets discoloured; it may be used until almost as dark as port wine, then decolorise it by shaking up with pure kaolin. 4. Face downwards. 5. Use glacial. Beaufoy's is less pure, is of uncertain strength, and costs almost as much.

DISK.—1. The collodion is not iodised sufficiently; the bath is all right. 2. See vol. i. p. 87.

SPHYNX.—It would be invidious on our part to recommend any particular collodion. Try the new collodion advertised in this number.

RAVEN.—The book is not yet written that we could conscientiously place into a beginner's hands, as containing all the information, and no more, necessary to make him a good photographer. We quite agree with you that, were it possible to have the "PHOTOGRAPHIC NEWS" to the year 1860 at once on our tables, we should want no other book on photography. Is it not worth while to wait a year or two for such a glorious consummation?

T. T.—*We* are the best judges of how much information it is advisable to place in the student's hands each week.

J. D. WATCHETT.—Send an address, and we will communicate with you.

G. A. H.—We have heard of such a result after using very impure nitrate of silver in the bath; but the true cause is not known. Make a fresh bath with pure nitrate.

CHEMICUS.—The proposed alteration will make a very good glass room.

J. S.—Use a copying camera.

W. H. W.—We shall be very pleased to see you. Has your bath too much alcohol in it? that is the only suggestion we can offer.

VOLO NOSCERE.—Send an address, and we will communicate with you.

Communications declined with thanks:—Lens.—R. P.—J. K.—A Painter.—X. Y. Z.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—S. D.—Regular Subscriber.—P. T. & H.—In a Fix.—Tycho.—A. C.—L. M.—A Correspondent.—Subscriber.—W. A. F.—Stereo.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 12.—*November 26, 1858.*

We feel it due to the character of this Journal, as well as to those gentlemen who honour us with their support, to offer some remarks on an article which appeared in the last number of *the soi-disant* official organ of the Photographic Society; an article not less remarkable for its style—or rather for its want of style, and the absence of logical reasoning—than for the unfounded insinuations which it contains. We do not complain of it on the score of the literary ability—or, perhaps it would be more correct to say, on the want of it—displayed in its composition, nor of its illogical reasoning. That is an affair with which we have no concern. We have only to deal with the insinuations it has levelled against us. The article in question states "that members complain that notes of their communications, more or less inexact, are taken without their consent, and printed without their revision." To the first part of this charge we reply by a flat contradiction. Our own reporter was present; and we can assert, from our own knowledge, that the report was substantially a fair and correct report. In further proof of this, we may add that not a single complaint has reached us from any gentleman who was present at the meeting. Moreover, we have another proof to offer that the latter part of the charge is, equally with the former, as unfounded as it is malicious.

At the meeting in question, the only paper read was that by Mr. Traer, on "The Photographic Delineation of Microscopic Objects"; and, at the conclusion of the meeting, our reporter waited on Mr. Traer, and requested him to allow him to copy his paper—a request with which Mr. Traer, with the courtesy of a gentleman and the liberality which usually characterises scientific men, complied. The report, therefore, which we published was a literal transcript of that paper. So much for this part of the article!

The most extraordinary part, however, of this very extraordinary production, which the Council has thought fit to publish, is the assertion that they are "eager for publicity;" and in the same breath the declaration that "the Society is its own reporter"—a declaration which, if it means anything at all, means that it alone has the right to publish reports of its proceedings. It is impossible to reconcile these two statements. If the Council is really desirous that the greatest amount of publicity should be obtained for its proceedings, why does it complain because "The Photographic News" anticipated the report in its own organ? Surely, if anything is said at these meetings with which it is desirable that photographers should be made acquainted, this object is better attained by its publication in a Journal which is read throughout the length and breadth of the land, than by its being confined to the pages of one that is little more than an organ for a *very select* circle of readers! Does the Council imagine that the circulation of "The Photographic News" is as limited as that of its own special organ? If it does, it will be somewhat surprised to learn that "The Photographic News" numbers its readers by tens of thousands—a piece of information with which, considering its eager desire for publicity, the Council will, no doubt, be exceedingly gratified.

We have no hesitation in asserting that the desire expressed by the Council that the greatest publicity should be given to the discussions at the meetings of the Society is a mere pretence, their real desire being to impede the increasing circulation of this Journal—a task which it is as far beyond their power to accomplish as we believe it to be distant from the wishes of the majority of the members of the Society. Indeed, it would be absurd to suppose that the members of the Society could have any other feeling than satisfaction at seeing their remarks published in a paper which circulates not only in England, in India, and in every English colony, but also over the greater part of the continent, where it is quoted as an authority on photographic matters—a circumstance which, however flattering, we should scarcely have thought of mentioning, but for the unwarrantable attack which has been made upon us.

Again, we may well ask, what interest can we be supposed to have in the publication of these reports, beyond the desire to be of service to the members of the Society? It is certainly not from any expectation that we shall thereby increase the circulation of this Journal that we give them publicity; and, so far as advantage to ourselves is concerned, we might well be content to leave them entombed in the pages of that journal, which depends for its continued existence on its being the chosen receptacle for all the desultory conversation indulged in by a few garrulous members at their meetings. We trust that our real motive is obvious to every impartial and honest man. It is simply the anxiety we feel that every photographer, who has devoted months or years of labour to the study of some particular subject connected with Photography, should receive, in the increased respect and esteem of his brethren in the art, the reward due to his exertions. Take the case of the gentleman whose paper has given rise to this ebullition of wrath on the part of the Council. He has spent a long time in the study of the best method of reproducing *microscopic objects* by means of Photography. He devoted some time to the preparation of the paper; and then took the additional trouble to read it—and to what end? Where would have been his reward if the paper had been buried in the columns of a journal which not one in five of those who receive it ever reads; whereas it has now been read in every nook and corner of England, and wherever the English language is understood?

We have now done with the matter as far as we alone are concerned, but we have still to advert to a "resolution" to which the article we have animadverted upon may be considered the preamble; it runs thus—"Complaints having been made that the papers communicated to the Society appear in other journals" (this is untrue, as regards the question at issue; the paper appeared in the "Photographic News" alone) "before their publication in the Society's journal, it is re-

solved, that the secretary be directed to request the proprietors to desist from such publication."

It might be inferred from this, that the Society is a private one, and that the speeches delivered at their meeting should be as sacred from publication as though they were uttered in one's own house. Now the Council expressly states that the Society is a *public* body; and at the same time it announces its determination to take legal proceedings to prevent the publication of the communications referred to in the resolution. Such a threat is, of course a mere *brutum fulmen*. Without stopping to discuss here the legal bearings of the case, which will have proper attention at the proper time, we may merely state that we presume that the meeting of a public body must, necessarily, be a public meeting; and as such we have a perfect right to report its proceedings in as full and complete a manner as we think they deserve. As, however, we have not yet received the request with which, in accordance with this remarkable resolution, we were to have been favoured, we can only conclude that discretion may have suggested itself as the better part of valour.

We regret that the names of the members of the Council, whose united wisdom led them to the enunciation of the above dignified resolution, are not appended to it. We are thoroughly convinced that its members generally, with one or two notorious exceptions, would have resisted, had they been present, such a paltry and futile attempt to injure this Journal.

In conclusion, we may assure those members of the Photographic Society who honour us with their support, that we shall not be deterred by threats from giving immediate reports of proceedings that may take place at the Society's meetings, and which we may deem of sufficient importance to entitle them to a place in the columns of the "Photographic News."

PRINTING IN CARBON.

The French Photographic Society will have no easy task to perform, when the day arrives, for awarding the prize offered by the Duke de Luynes for the discovery of a method of printing photographs in carbon. It is at present impossible to form any idea of what will be the number of claimants for this prize; but we do not see why they should not be so numerous that, if they felt disposed for a trip to Paris in the pleasant month of June, they might make it profitable for the "Great Eastern"—or "Leviathan"—which is it? to take them to Boulogne altogether, and wait to bring them back again. It would be strange indeed if, considering all that has been written on the subject, any photographer, possessing even a slight knowledge of chemistry, could not hit upon some plan of printing photographs which should be more or less a carbon process. We are ourselves but young, though, of so goodly a growth, that we might well be esteemed the senior of our contemporaries—and therefore have had but little to say on the subject. We will now, however, give a brief analysis of what has been written on the carbon process; and if, with the aid of these observations, and what we have written previously, our readers cannot discover how to apply it, we imagine it will be their own fault.

For very many years past photographers have been aware, that a mixture of bichromate of potassa and gelatine is sensitive to light, and this knowledge has been rendered available in most of the processes of photo-lithography; and, as a natural consequence, this suggested the possibility of its being modified, so as to be made available in the printing of positives; hence, finely divided carbon was mixed with the bichromate of potassa and gelatine, and not only carbon but various other pigments have been tried, with results which may be best described as more or less unsatisfactory. Still they were pictures, even if they were not very good ones; and we entertain very little doubt that any photographer, who has time at his disposal for experiments, might improve the process so far as to make it useful.

There is at the present moment a subscription open to purchase the process of carbon printing, the secret of which belongs to Mr. Pouncy. This gentleman announced his discovery in a letter to a contemporary on the fifth of March last. The enthusiastic manner in which his communication was received would have been laughable, but for the importance of the discovery to which it referred. It prophesied that, "the abominable process at present employed will be swept away, and superseded by another, which will satisfy both artist and chemist;" and then, as if conscious that this high-flown enthusiasm was rather ridiculous under the circumstances, it added—"Our readers may smile at these predictions, and think us rather too enthusiastic; but, if the truth must be told, we rather pride ourselves on the *practical* character of our suggestions, and assign three months as the probable date of the fulfilment of the predictions now committed to print." Our contemporary affords another instance of the danger, when prophesying, of committing one's self to figures. Since this daring prophecy was uttered nearly eight months have elapsed, and it has not yet been realised. We are, however, consoled with the assurance that we shall not wait for it much longer. Mr. Pouncy is described as a man who is now in a position to *give* the public the benefit of his discovery; but our contemporary was too energetic and philanthropic to suffer any such obstacle to shut out the public from the advantages opened up to it by this discovery: it therefore proposed to purchase Mr. Pouncy's secret, (which he offered to communicate for £50,) and to raise the means through a shilling subscription. Yet, so little did the mass of photographers appreciate the importance of the process (which was to save them we don't know how many pounds a year in nitrate of silver alone), that the subscription, after dragging along for months, only numbered 300 subscribers. At this stage of the affair, our contemporary entered into an agreement with Mr. Pouncy to make up the difference between the amount subscribed and the £50, and to trust to subsequent events for recovering the amount advanced. The manner in which it was proposed to communicate the process was by means of a pamphlet, which was to be forwarded to each subscriber, together with a license to print; but, at this critical moment, when our contemporary was placed in possession of the secret, he discovered, that it so closely resembled two processes for which letters patent had been taken out that it was unsafe to grant licenses. The process of Mr. Pouncy is thus described in the specification lodged by him:—

"This invention has for its object improvements in producing photographic pictures on paper and other surfaces. The surface has usually been prepared with substances which, when acted on by light in the process of producing the picture, are chemically acted on so as to produce (either immediately, or when other substances are applied afterwards to the surface) the colouring matter or substance in which the picture is formed. Now, according to my invention, I prepare the paper, or other surface, for having the picture produced on it, by applying over its whole surface the colouring matter which is to form the picture, and, together with this colouring matter, is applied a substance which is acted on by the light. The following is the manner in which I proceed when printing positive pictures on paper from negative pictures:—I coat the paper, or surface, which is to receive the picture, with a composition of vegetable carbon, gum-arabic, and bichromate of potash; and on to this prepared surface I place the negative picture, and expose it to the light in the usual way: afterwards, the surface is washed with water, which dissolves the composition at the parts on which the light has not acted, but fails to affect those parts of the surface on which the light has acted; consequently, on those parts of the surface, the colouring matter remains in the state in which it was applied, having experienced no chemical change. Sometimes, for the vegetable carbon, I substitute bitumen; or other colouring matter may be employed."

It is affirmed by our contemporary that this process is not precisely that which Mr. Pouncy proposes to sell; but,

if it is not, we imagine that the difference is immaterial. In fact, the position which Mr. Pouncy has assumed appears to us to be very similar to that of the horse-taming Mr. Rarey—he has first published his process, and then, without acknowledging this, he has asked the public to buy the "secret."

The two processes referred to above are those of M. de Beauregard and M. Poitevin. The process of the former consists in coating a sheet of paper with a saturated solution of bichromate of potash, in which a certain proportion of gelatine or gum-arabic has been dissolved, and, when dry, the gelatinous surface is rubbed with a colouring matter, such as blacklead. M. de Beauregard also claims an exclusive right to the employment of other methods of accomplishing similar results. With respect to Poitevin's process (not that we described in a previous number), the specification is so vague, that it may be precisely the same as M. Beauregard's.

Here the matter rested for some time—the next reference to the process being simply to inform us that Mr. Pouncy had not been idle—that he had greatly improved his process—but that he did not intend to publish it until after the prize offered by the Duke de Luynes had been awarded. A fortnight later we are rather abruptly informed that the subscription list is now open, but this time £100 is the sum required to purchase the secret; and, at the present moment, we believe that nearly the whole of that sum has been subscribed. Whether the subscribers will be found to pay up their subscriptions as readily as they promised them, is another matter. For our own part, we cannot help thinking, that if Mr. Pouncy's process is as good as it has been described, that he would have gained five times the sum above mentioned if he had published it first, and trusted to photographers to raise a subscription to repay him for his trouble afterwards. As it is, the begging letter style in which photographers have been worried for subscriptions, has excited doubt and mistrust as to the value of the discovery.

QUESTIONABLE SUBJECTS FOR PHOTOGRAPHY.

In a recent number of this journal we noticed a stereoscopic slide, published under the attractive title of the "Skeletons' Carouse," which was not only revolting as far as the desecration of human skeletons goes, but was positively disgusting as beheld in the stereoscope, which of course added much more to the ghastly effect of the whole picture. We have often pondered upon the subject of the present degraded state of stereoscopic illustration, and are again induced to revert to the subject, because we feel that not only do the cause of Photography and the claims of Art demand it, but, we are ashamed to add, decency calls for it. We observe with regret that there is every day a more perceptible tendency to debase that really useful and instructive instrument, the stereoscope, not only by the production of tasteless and insipid compositions, but of positively improper pictures; and from the increase and variety which almost daily present themselves in the shop windows of even respectable traders, it is evident that the demand for this sort of thing is on the increase. The enormous run which silly "Christenings," sentimental "Weddings," and namby-pamby "Broken Vows," have, is really astonishing. If the subject, however, be carefully studied, there will be found to be a reason for it all; and the one at which we have arrived is this, that the stereoscope is "the poor man's picture gallery," and that owing to the present comparative cheapness of the instrument, many who have indulged in the luxury have felt such a pleasure in beholding objects stand out in relief, that they have become enamoured of anything stereoscopic, and in their anxiety to procure something which should present the same novelty, they have not cared to be over particular in the selection of subjects; and as weddings and that class of composition have appealed to the sentimental feelings of the young-lady portion of the public, there has arisen a great demand for that class of picture.

The composers, having exhausted all their ingenuity in discovering new subjects of this class, at length turned their attention to the production of another class of picture. The specimens exhibited were at first so mild, that it would have appeared straightlaced to have objected to them; then by degrees they became more and more vitiated, and now they have arrived at a pitch of impropriety which calls for the interference of the police authorities. There is nothing so palpable in these slides as the fact that they, like the Pindaric razors, are made "to sell;" but there is this consolation, in addition to the almost certain fact that the demand must surely fall off, that the slides so printed will fade; so that what was once a stupid or improper picture will, in the course of time, become something infinitely better—a slide of white paper.

Although we may be called "ill-tempered," we nevertheless persist in the opinion that composition is scarcely applicable to photography. The perpetrators of these stereograms of course are opposed to this, inasmuch as stereographic composition enables them to produce pictures which stand out in relief; but in any case, no one will, we presume, deny that composition is the most difficult department of photography; and does it not therefore follow that it should only be practised by those who have a true artistic feeling? Now, it is not a little surprising that the leading compositive photographers—Rejlander, Robinson, and others—seldom attempt (as far as we know) the composition of a stereogram? *A fortiori*, then, is it not the height of absurdity for men who have not the least sentiment or poetry about them to attempt to illustrate either an incident or compose a picture? If these would-be artists wish to display their cleverness, why not turn their attention to the hundreds of other subjects which might be mechanically done, and leave that department, which is acknowledged by all to be the most difficult, for those who can do it?

Our more particular object in this article is to call upon all who deserve the name of photographers to take some means to put down the publication of improper pictures—that class which has earned for itself the title of "Holywell-street revived." Lord Campbell's famous Act had for its object the suppression of demoralising works and pictures, which were notoriously sold, more especially in the above-named street; but in the case of those lithographs which were a disgrace to human nature, there was at least the consolation of knowing that they had no existence except in the salacious imagination of some immoral draughtsman, who prostituted his talents to so vile and degrading a purpose; while in the slides we are alluding to we have the full assurance that a *woman* has been the model. One remarkable feature in the majority of this class of stereogram is, that they seldom or ever include any female who approaches in the remotest degree to a Venus; they are always characterised by more or less of a coarse ugliness, and certainly neither the demand nor the pecuniary value will be enhanced by admiration for the intrinsic beauty of the figures. The Saturday *Review* some time ago called attention to this subject in a very able article. Speaking of the effect of Lord Campbell's Act, it said:—"How far the filthy commerce which Lord Campbell proposed to check has been subverted we have no means of knowing; but we do know that exhibitions, which do not exactly fall within the scope of his bill, but which are perhaps better calculated to effect the infamous objects which it attempted to discourage than indecencies of a coarser description, are extremely common; and unless we are much mistaken, have recently increased to an enormous degree. There is hardly a street in London which does not contain shops in which photographs, and especially stereoscopic photographs, are exposed for sale, which are certainly not positively indecent, but which it is equally clear are expressly intended for the gratification of that prurience which Parliament tried to deprive of its coarser stimulants." Our contemporary may not have seen exhibited photographs which were positively indecent, but we have seen some which ought at once to be consigned to the flames—there are many

such published. It goes on to say:—"We cannot, of course, enter into particulars upon such a subject; but if any of our readers will walk down the Strand, he will see numerous shop windows, in other particulars of the most respectable character, which are studded with stereoscopic slides, representing women more or less naked, and generally leering at the spectator with a conscious or elaborately unconscious impudence, the ugliness of which is its only redeeming feature. There is a brutal vulgarity and coarseness about some of these pictures which are as surprising as they are disgusting. We have seen publicly exposed, in a shop of decent appearance, a slide representing a woman in bed, with a man in his night-cap and night-shirt seated in a chair nursing a baby, and underneath written 'My Last Edition.' To call such things indecent is perhaps in some cases unjust; but even when they are not open to that imputation they show a stupid, coarse vulgarity of taste and sentiment which is a natural introduction to indecency of every kind. The more we think of the way in which such things are made, and in the use for which they are designed, the more apparent does their offensiveness become. Decency is a matter rather of sentiment than of fixed rule, and there would be far more indecency in sitting a single time for any one of many dozens of the photographs in the Strand than in adopting the profession of an artist's model."

As our weekly contemporary very properly remarks—"It must be remembered that a picture is always to some extent idealised. A Grace, a Nymph, or a Venus, is an unreal, conventional being, whom we associate only with picture galleries; but it is the very merit and object of these photographs to reproduce the real actual woman in the very attitude in which she agreed to pander to the vulgar tastes of mankind." We regret extremely that our space will not allow us to give in full the admirable article from which we have quoted; but as the PHOTOGRAPHIC NEWS circulates amongst that class who produce these slides, we therefore call their attention to the question, and we think that they will at once see, unless their sense of decency is too far vitiated, that they are bringing upon our favourite art a scandal which it is highly desirable to have removed at once. To our mind there is something positively sacrilegious in the idea of prostituting the light of heaven to such debasing purposes.

To show that we are not taking too extreme a view of the case, and that what we have just said is not too strong, we cannot do better than extract the following lines from an article on the subject which appeared in the *Morning Post*:—"On behalf of public decency we implore the authorities whom it may concern to direct a scrutinizing eye at the windows of photographic salesmen. Holywell-street is fairly out-rivalled, and fast-going tobacconists are cast into the shade by the more outrageous displays of men who would loudly grumble if their pretensions to art and science were not allowed. It is needless to particularise—it might be imprudent to do so; but most observant wayfarers through London streets during the last few days must have seen in the windows of certain photographic shops, much to their disgust, outrages against common decency endeavoured to be palmed off under the specious pretence of their being works of art. We are not squeamish. Our principles are compatible with the fullest legitimate scope of the pictorial and sculptured art. We do not feel called upon to clamour for a general investure of such figures with togas and fig-leaves; we are not shocked at the sight of a Cupid without pantaloons—not hypercritically fastidious about the pose of a Venus or a Hercules; but to see a too life-like representation of courtezanship transferred in all its faithful hideousness to picture tablets by photo-actinism—a very microcosm of impurity—this is one of the things we cannot look upon without disgust. To our apprehension no sort of pictorial offence is so utterly bad and abominable as is perpetrated by these too faithfully-rendered stereoscopic pollutions. There can be no surer dictum of Art than that which insists upon the existence of traits and markings in nature unfit for literal rendering. The very essence of Art resides in the poetry of it, and without imagination there is an end of poetry. It should be enough, in respect to the photographic abominations of which we speak, to call them *abominable*. Unlike ordinary pictures, where models supply the mere ideals, the photographic slides are the *very* models. Every one of those startling poses had its representative in nature. Every trait of the original is there. Just fancy the organisation of vice which it implies—vice under the garb of Science and Art."

We have been betrayed into greater length than we had at first contemplated, but it is solely owing to our anxiety to see this scandal suppressed. The morning journal from which we have quoted the above calls upon the police for a "razzia" against the demoralising exhibition.

While on the subject of improper photographs, we may state that we were recently scandalised at seeing two or three very questionable photographs, but more especially one, exposed in a place where we should above all others least have expected it. It is a coarse, vulgar photograph of a nude female figure seated on a couch in anything but a graceful attitude—indeed the photograph is quite as bad, if not worse, than the majority of those which we have condemned above. We have felt it our duty to allude to this subject; and, "although it is not an agreeable theme to refer to, we would recommend to those gentlemen who do not wish to see the degradation of Photography, not to allow their own productions to be exhibited side by side of such degrading associations,"* and to use their influence in endeavouring to remove the disgusting photograph to which we have referred from the walls of the Photographic Society's rooms in Coventry-street.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.

BY MM. DAVANNE AND A. GIRARD.

THE well-demonstrated influence of abundant sizing in the preparation of positive proofs, might give us the reason for the general practice by photographers of laying on the paper, as prepared by the maker, of an additional layer of size, formed either of starch, gelatine, or albumen. Preceding researches have established that in gradually augmenting, up to a certain point, the number of the sizings, the proof acquired in the same proportion additional vigour and sharpness. But it is important to inquire if all amylaceous substances have the same value, and to institute a similar comparison between gelatinous and albuminous substances.

1. *Amylaceous Substances.*—Starch, when employed in the same proportion, under the most varied forms, has always given sensibly identical results. The results have been the same whatever the substance employed; or, if any perceptible difference has been exhibited in one or two cases, it should be attributed to the difference of hydration in certain substances employed.

2. *Gelatinous Substances.*—All gelatine gives, to equal weights of dry organic matter, the same results. We have sized a sheet of paper with an equal dose of the following substances:—parchment size (commonly known as white size), Flanders size, Givet size, white transparent size, and fish size, and we at once perceived a striking difference between the proofs sized with those different substances. To take only one example; if we consider those known as Flanders size and Givet size, we see that in an equal dose (5 per cent.) the first gives a much redder and more vigorous proof than the second.

In examining these two sizes from the point of view of their composition, for the reason of these variations, we soon saw that, though identical as being organic matter, they differed greatly in respect of the quantity of mineral matter they contained. In fact, when calcined, they left a

* Quoted from the official organ of the Photographic Society, Vol. V., p. 19.

residue formed of the product of the decomposition of the alum employed in clarifying them, and this residue amounted

For the Givet size, to	... ...	2·5 per cent.
For the Flanders size, to	... ...	4·7 per cent.

If it be remarked that the greater proportion of residue corresponds with the reddest and most vigorous proof, it will be readily understood that we were at once led to consider the alum as the primary cause of this difference, and to essay its action from this point of view; and the result of experiments confirmed our anticipations. In fact, taking any ordinary sheet of paper, if we sized one half with alumed gelatine, at 2 per cent., we found that the picture on this half was far redder than on the other. Still better, this precise and general action of the alum, whether ammoniacal or potassic, exercises itself equally on all the manufactured papers, and on those which have an additional sizing of starch, as direct experiment has shown us. In fine, gelatinous substances employed in an equal dose, and a deduction made for the mineral matter, produce the same effect; strengthened with alum, they give redder and more vigorous proofs.

3. *Albumenised Substances.*—Albumen, which naturally we had not been able to examine when studying the sizes used in manufacturing, necessarily engaged our attention for some time, for the especial reason that it constitutes the additional sizing most frequently used among photographers. Albumen gives a red colour, an *éclat*, and a vigour to proofs, which is greater in proportion to the quantity of that substance used. Treatment with water containing only $\frac{1}{10}$ of albumen, suffices to produce a modification; with $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$, the vigour augments; from this point the brilliant varnish due to the albumen appears, and goes on increasing for $\frac{5}{10}$, $\frac{6}{10}$, and finally attains its maximum with pure albumen. The ammoniacal albumen acts like ordinary albumen; it gives a more vigorous proof in proportion as the quantity is greater, but its energy is perhaps of a degree inferior to that of ordinary albumen. The dried albumen of commerce, employed in the dose of 12 parts of albumen to 100 of water, gives a less clear solution, but which may, notwithstanding, be perfectly utilised instead of fresh albumen, which it replaces in the most perfect manner.

(*To be continued.*)

ON THE DEVELOPMENT OF NEGATIVES BY GALLIC ACID.

BY M. LASSIMONNE.

The following communication was addressed to the Editor of the *Revue Photographique*:—In a communication published in your columns, I suggested the employment of gallic acid, concurrently with acetate of lead, as a powerful and rapid developer; but the manipulation, which is extremely delicate, requiring great practice, only a few persons have succeeded in their attempts at using it. The failure arose from the manner in which the acetate of lead was employed.

My persistence in the use of gallic acid to develop negative pictures enables me to simplify in a singular way this process. The acetate of lead is now to me but a matter of secondary importance; I can do without it by substituting acetate of lime or ammonia. My mode of operating is as follows: after having saturated a certain quantity of alcohol with gallic acid, I add, as soon as the dissolution is complete, a volume of water equal to that of the alcohol, I then strengthen the mixture with five per cent. of acetic acid, and filter.

In another way, I dissolve 2 parts of acetate of lead in 100 parts of water.

When the collodionised glass has received the luminous impression, I pour on its surface a certain quantity of the first solution, that is to say, the mixture of alcohol, water, and gallic acid, and the picture appears immediately. After having allowed it to exercise its action for a time, I add, if the proof wants vigour, a small quantity of aceto-nitrate of silver, or of the sensitising bath. At the end of three or four minutes the picture will have acquired the desired intensity.

If it be desired to hasten the coming of the picture, it will suffice to add to the liquid some instants before the appearance of the image in its details, one drop of the solution of acetate of lead mentioned above. With this process the time of exposure in the camera is less by two-thirds than when the pyrogallic acid is used; but the great recommendation of this mode of development is the excessive delicacy and sharpness of the pictures, which may be compared in these respects with the proofs obtained on albumen.

It is very important not to develop the picture overmuch, for the greenish yellow colour which characterises it will render the passage of the luminous rays difficult in printing positives. A very light negative gives excellent results.

This mode of development allows all collodions to be employed indifferently; I think, however, it will be well to give the formula I myself employ habitually, and with the most satisfactory results.

I compound an iodurated liquid as follows:—

Alcohol at 36°	... ...	150 parts.
Iodide of potassium	... ...	5 "
Iodide of ammonium	... ...	5 "
Iodide of cadmium	... ...	5 "
Iodide of zinc	... ...	5 "
Bromide of ammonia	... ...	1 "
Bromide of cadmium	... ...	1 "
Fluoride of potassium	... ...	1 "

I first dissolve the iodide of potassium in the entire quantity of alcohol, and then add the other substances in succession, which dissolve easily; this solution, put in a flask, is always kept in a zinc bath, which allows the liquid to retain a complete neutrality. Six or seven parts of this solution to 100 of normal collodion is the proper proportion.

ON VARIOUS METHODS OF PRESERVING PHOTOGRAPHS AGAINST CHANGE AND DESTRUCTION.

BY M. VON MONKHOVEN.

1. To fix a positive proof in a durable manner it should be washed as thoroughly as possible in water, on being withdrawn from the copying frame, in order that there may only be in fixing an extremely small quantity of silver.

2. The hyposulphite of soda bath ought to be used in a concentrated state, in order that the hyposulphite of silver formed may not remain in the texture of the paper.

3. In the fixing bath, prepared with 300 parts of hyposulphite of soda to 1000 of water, not more than about 20 proofs of a large size should be fixed.

4. More than 6 proofs should never be submerged in a bath 1½ inches in depth, at one time.

5. There should never be mixed in this bath either an acid, an alkali, or any substance capable of eliminating sulphur; or, if any such body is introduced, the bath should remain undisturbed for at least fourteen days before using it again.

6. An old hyposulphite of soda bath, in which a black precipitate of sulphide of silver is observed, ought no longer to be employed for fixing proofs.

7. It will always be advantageous to strengthen the picture in a neutral gold bath, because the gold deposited preserves it, in any case, against every kind of gas contained in the atmosphere which could exercise a destructive action upon it.

8. The proof taken out of the fixing bath ought to be carefully washed in a sufficient quantity of water, frequently renewed; nevertheless, this operation ought not to be prolonged beyond 24 hours.

9. Care should be taken that the substance used for fastening the proofs upon the pasteboard, should not be capable of acting chemically upon the picture; gum and gelatine are the best substances to employ for this purpose.

10. The proofs thus mounted ought to be kept in a dry place.

Lessons on Colouring Photographs.

COLOURING has been said to be "the sunshine of art, that clothes poverty in smiles, and renders the prospect of barrenness itself agreeable, while it heightens the interest, and doubles the charms of beauty." The reproduction of objects in their natural colours, by means of the camera, is a subject which has occupied much of the attention of many of the most illustrious pioneers of photography; but, as yet, without definite result. Until that problem is solved, to give photographic portraits their full value as *likenesses*, to give them life and individuality, the photographer must have recourse to the art of the painter. We purpose, therefore, to lay before our readers, in a series of articles, the simplest and most efficient mode of colouring positives on glass and paper, in photographic powder colours, water colours, and oil colours, so as to produce satisfactory and artistic results. As many of our readers are, doubtless, entirely inexperienced in this branch of the art, we shall begin at the beginning, and endeavour to make the matter clear to the most uneducated capacity: premising, however, that whilst much is possible to steady perseverance, there is not here, as there is not in any of the arts, any royal road to success. To obtain perfect results will require the constant exercise of a careful hand, a practised eye, and a cultivated judgment. We shall commence with the process of—

COLOURING POSITIVES ON GLASS.

The first step necessary is to procure the requisite materials. To have even the slightest chance of success, it is important that these should be good in quality, and prepared for their purpose under the superintendence of persons practically acquainted with the requirements of photography. It has, unfortunately, happened, that this condition of success has not frequently received attention, and that much of the artistic material appertaining to photography has been, like the pedlar's razors, made for sale and not for use. As it is obvious that we cannot here refer to the productions of individual manufacturers, we will, as far as possible, minutely describe the proper characteristics of material suitable for producing good results.

Photographic Powder Colours.—These furnish the only suitable and simple means of colouring collodion positives on glass. They are applied in the form of impalpable powder, with a dry pencil, to the collodion film. They should, if properly prepared, be brilliant in colour, transparent, and, as far as possible, permanent; they should, at the same time, "bite" well, or adhere readily to the surface of the plain or varnished collodion film. Some colours there are which appear brilliant enough when seen in bulk; but which, from being manufactured of inferior and unsuitable pigments, or from being imperfectly prepared, have an insipid and dull effect when applied to the picture, and, at the same time, rapidly fade when exposed to light. Others, from similar causes, are entirely destitute of transparency; and, when applied to the photograph, obscure both lights and shadows, and give to the whole a muddy, flat, coarse appearance. As dry colours are applied to the half tones and some of the shadows as well as to the lights of the picture, it is obvious that unless they possess the utmost transparency, they will mar rather than improve the photograph. And, however pure in tint or delicate in texture, unless they *bite* sufficiently with very simple manipulation, good results cannot be hoped for. Some manufacturers, in order to secure this "bite" in their colours, add a portion of some resinous gum in grinding; the desired result is, to some extent, generally secured by this means, but with this drawback, that when the picture is varnished the gum is dissolved, and the colours consequently run. The best colours we have used are prepared by some peculiar process, known only to the manufacturers, which secures a facility in applying them that leaves nothing to be desired. Powder colours are prepared in tints suitable for every purpose, and, if a proper selection is obtained, rarely require mixing. A recent writer, speaking of these colours, intimates that, if they be found too powerful, they should be "reduced with *white*, which bears the same relation to powder colours that water does to ordinary cakes." Such a remark could only arise from an entire absence of practical knowledge on the subject, and, if followed, could only lead to disappointment. Dilution of cake colours by means of water not only abates their intensity, but increases their *transparency*, by so much as it thins the layer of pigment on the picture. The addition of *white* to powder colours, on the contrary, whilst it certainly lowers their brilliancy, at the same time increases their *opacity*; it also imparts a cold, dull, unnatural effect. Colours ready-prepared of the required delicacy of tint should be procured at the outset, especially for flesh tints; by all means we should avoid the brickdust-like powders, which, applied to the photograph, yield a complexion like that of a Red Indian. We cannot here enumerate the tints required: we merely remark that, the more complete the variety, the more easy and pleasant will the practice become, and the more satisfactory the results obtained. We have dwelt sufficiently, we think, on the characteristics of good colours to impress the reader with the importance of possessing them, and to guide him in selecting them.

Brushes.—The quality of these is not of less importance than that of the colours. The camel's hair and sable pencils prepared for use with water colours will not do; they should be manufactured expressly for this purpose. For general use camel's hair is more suitable than sable: the hair should be short and thick in proportion to its length; carrying a fine, firm, and well-supported *natural* point. For fine lines a few small sables will be desirable. It is well to keep a stock of brushes ready-prepared for use; they should be agitated in a glass of clean water, and brought to a point by drawing them through the lips. The point thus produced will, if the pencils are properly manufactured, be retained when dry, and work for some time without spreading.

An India-rubber bottle, with tube attached, to blow away superfluous colour, will be required. For this purpose vulcanised India-rubber should be avoided, as the particles of sulphur are often detached, and cause spots of sulphuret of silver on the plate. A large camel's hair duster, a tube of moist Chinese white, gold and silver shells, with a varnish of which we shall have to speak hereafter, will complete the equipment.

In our next article we shall proceed to describe the manipulation in detail.

(*To be continued.*)

Photographic Chemistry.

SALTS.

1. If an acid be added to a salt, one of three things will happen,—the acid is without action on the salt, or it takes possession of the base and liberates the acid, or the two acids divide the base between them.

It is commonly said of an acid that displaces another, that it is more energetic; such acid may be more or less energetic according to circumstances. The phosphoric, boric, and silicic acids, which displace the sulphuric acid without the intervention of water, at a high temperature, are, on the contrary, driven from their combinations by this same acid, when one operates through the medium of water. Speaking generally, a gaseous or volatile acid is eliminated by a fixed acid, and a fixed acid giving soluble salts is eliminated by a fixed acid which gives insoluble salts.

2. The action of the bases on salts may be defined and classified in the same manner. Either the base does not react on the salt, or it seizes its acid and sets its base at liberty, or the two bases divide the acid between them.

The bases which, under the ordinary circumstances of experiment, displace the others, are termed the most ener-

getic; a fixed base commonly eliminates a volatile base, and a base which yields an insoluble compound displaces the base which gives soluble salts.

3. When two saline solutions are mingled together, if the acid of the one with the base of the other is capable of giving an insoluble compound, this compound is generally formed. There is, in that case, an exchange of acid between the two bases, which is what is termed the phenomenon of *double decomposition*: for example, nitrate of oxide of silver, *soluble*, Ag O. N O_5, and the carbonate of soda, *soluble*, Na O. C O_2 mingled together, give immediate rise to this double decomposition, and the result is—carbonate of silver, *insoluble*, Ag O. C O_2, and nitrate of soda, *soluble*, Na O. N O_5.

Double decompositions are made under proportional weights or equivalents; the equivalent of oxide of silver which neutralises 1 equivalent of nitric acid, also neutralises 1 equivalent of carbonic acid; in the same way, the equivalent of soda which saturates 1 equivalent of carbonic acid, also saturates 1 equivalent of nitric acid. If there is an excess of either salt, this excess remains in the liquor without being decomposed: for example, when a paper impregnated with the iodide of potassium is submitted to the action of the nitrate of silver bath, the entire of the iodine present unites with the silver, forming iodide of silver; and after this, no matter how much the contact may be prolonged, or how concentrated the bath, the reaction is complete as soon as all the soluble iodide is converted into insoluble iodide.

We may add, however, that the presence of a salt foreign to those, the reaction of which we expect; or even, in certain cases, an excess of either of the two salts employed, may give rise to different results. Thus the iodide of potassium and the nitrate of silver yield an insoluble precipitate of iodide of silver; but if the mixture is made when hyposulphite of soda, or any other *solvent* of the iodide of silver is present, the precipitate is not formed: in the same way, the nitrate of silver in excess gives a precipitate with the cyanide of potassium; but this precipitate is not formed when the cyanide is in excess, cyanide of silver being soluble in a solution of cyanide of potassium.

Of course we cannot, in this place, give a history of all the salts; but at some future time we will give a chemical analysis of the more important substances used in photography.

(*To be continued.*)

Dictionary of Photography.

Actinism is the term which has been given by Mr. Hunt to that principle of the solar spectrum which produces the phenomena of chemical change. It has been shown that neither the force which causes the sensation of light, nor that which produces the phenomenon of heat, has decided chemical action, and, consequently, we are driven to the hypothesis of the existence of a new form of force in the sunbeam, coexisting with heat and light. In order to designate this, the word actinism has been proposed. This word signifies nothing more than *ray-power*, and therefore, as it involves no theory, it is not open to the objections which, unfortunately, must be made to many of the scientific terms in common use.

Actinometer.—An instrument for determining the variations of actinic power. The registration of the ever-varying photographic intensity of light is so important a subject, that it has occupied the attention of several eminent scientific observers. It was noticed at a very early period that the chemical activity of the solar rays varied considerably at different hours of the day. Arago, in his address to the French Academy on the discovery of the daguerreotype process, remarked, that there was a great difference in the photographic power of the sun when observed at 10 A.M., and at 2 P.M. in favour of the latter. Further experiments soon showed that there were some alterations in the actinic properties of the light which required further investigation in order to understand it properly; and it soon became evident that great advantage would be derived from the construction of some instrument by which these photographic variations should be regularly recorded.

Mr. Jordan published a paper in the year 1839, on a "Description of a New Arrangement of the Heliograph for Registering the Intensity of Solar Light." In 1840 Sir John Herschel described an "Actinograph, or Self-registering Photometer, for Meteorological Purposes." He says, "The objects of such an instrument, which cannot but be one of material importance to the meteorologist, the botanist, and the general physiologist, may be considered as twofold, viz.: first, to obtain a permanent, and, at least, self-comparable register of the momentary amount of general illumination in the visible hemisphere which constitutes daylight; and, secondly, to obtain a similar registry of the intensity, duration, and interruption of the actual sunshine; or, when the sun is not visible, of the illumination of that point in the clouded sky behind which the sun is situated." Each of these instruments had many points of resemblance. The photographic paper was placed round a cylinder, which was inclosed in another cylinder which was moved on its axis at a certain rate by means of clockwork. A vertical slit, through which the light passed, being made in the outer cylinder, the variations of the light were recorded on that part of the paper opposite which the slit happened to be; and, by adjusting the rapidity of the movement of the cylinder so as to keep the slit always opposite the sun, the paper recorded every cloud which passed over its disc.

(*To be continued.*)

A Catechism of Photography.

THE WET PAPER PROCESS.

Q. Are there not several modifications of the calotype process?

A. There are, and amongst them the process adopted by French photographers is interesting and important.

Q. What is the process?

A. The operator dissolves 300 grains of isinglass in one pint and three-quarters of warm distilled water. Taking one half of this preparation, he adds to it 200 grains of iodide of potassium, 60 grains of bromide of potassium, 34 grains of chloride of sodium. As soon as the salts are dissolved the solution is filtered through a piece of linen into a large dish; into this solution the papers to be prepared, which must be of French manufacture, are then plunged, and, when thoroughly saturated, removed and hung up to dry.

Q. Can this operation be performed in the ordinary daylight?

A. It can, as in this state it is not sensitive to light. It may be preserved for a long time in a portfolio, for future use, and remain uninjured.

Q. What is the second operation?

A. 250 grains of crystallised nitrate of silver are dissolved in six ounces of distilled water. When the nitrate is dissolved add one ounce of crystallisable acetic acid.

Q. Is this solution affected by the action of light?

A. It is, and must therefore be prepared in a room chemically dark, and kept in a stoppered bottle excluded from the light.

Q. How is this solution to be employed?

A. When the operator requires it for use, a portion of the solution is to be poured into a glass tray, or on a porcelain slab surrounded by a glass or paper border. The iodised paper is then gently placed upon it, great care being taken that the face only of the paper shall be brought into contact with the solution. The paper must be allowed to remain in this position until a perfect formation of the chloro-bromo-iodide of silver has taken place.

Q. How can the operator ascertain when this formation has actually taken place?

A. The paper, when first subjected to the process, presents a violet colour at the back, which colour gradually disappears as the chemical change is effected.

Q. What time is usually occupied in this process?

A. From two to four or five minutes; but the time depends very much on the character of the paper.

Q. What is to be done with the paper so prepared?

A. A piece of white paper, thoroughly saturated and free from impurity of every kind, is spread upon the glass fitted to the frame of the camera. Upon this paper the prepared sheet is placed, with the sensitive side upwards. In this state it is submitted to photogenic action in the camera.

Q. Is it necessary to employ this paper in a wet state?

A. Undoubtedly; and this is, perhaps, its most objectionable quality; but the results obtained are often exceedingly beautiful.

Q. How is this picture developed?

A. Pure dissolved water saturated with an excess of gallic acid is used for this purpose. The operator should pour upon a slab of glass, held in a horizontal position, a little of the solution; the picture must then be placed gently upon it (as in the sensitising process) and so be allowed to remain until the development has taken place.

Q. How may this be ascertained?

A. It can easily be traced through the back of the paper, and it need not be removed so long as the back does not begin to spot.

Q. After the development has taken place, what is the next process?

A. The developed picture must immediately be washed in several waters, so as to remove any crystals of gallic acid which may have formed upon it.

Q. Is the picture "fixed" by this means?

A. No; it has to be further subjected to a strong solution of hyposulphite of soda, in which it is permitted to remain until every trace of yellowness has disappeared.

AMPHYTYPE AND CYANOTYPE.

Q. What is the *amphytype?*

A. Amphytype is an application of the calotype process, taking its name from the fact of negative and positive pictures being produced by one process.

Q. Who is the discoverer of this process?

A. Sir John Herschel.

Q. What is the *cyanotype?*

A. It is another process of calotype, so called by Sir John Herschel on account of cyanogen, in combination with iron, forming a leading part in the process.

WAXED PAPER PROCESS.

Q. What is meant by the *waxed paper* process?

A. The waxed paper process is an improvement on the calotype, and was first practised by M. Le Gray.

Q. What are the advantages of this process?

A. The waxed paper process has the advantage of preserving uninjured the sensitive papers, and, therefore, facilitating the labour of the photographic excursionist.

Q. Is the same description of paper employed in this as in other calotype processes?

A. The choice of paper, in any process, is exceedingly important and very difficult, but it is not of greater importance in this than in any other process. The texture should be uniform, the material pure and transparent, the surface smooth and firm. Papers produced by the same manufacturer are not all equally good for photographic purposes, and it is necessary to be guided by close inspection, and not by any particular name. Of all the various kinds of paper used by photographers the French manufacture of paper will be found the most invariably pure in quality, and the most free from defects. It is usually procured in sheets measuring $17\frac{1}{2}$ inches by $22\frac{1}{2}$ inches.

(*To be continued.*)

Correspondence.

PAGES FROM THE NOTE BOOK OF A TRAVELLING PHOTOGRAPHER.

Sir,—In the note you appended to my last communication, I presume it was not your intention to question what I stated as to the immovability of my camera, but simply to suggest that it might be shaky under certain circumstances—such as a rough wind, for example. No doubt, in this sense, the idea suggested by your experience is quite correct; but then I never meant to say it was immovable, or even so steady as a tripod, under such circumstances; but even the strongest tripod is susceptible of vibrations in a rough wind, as my experience taught me long ago. All through life I have been influenced by a maxim, impressed upon me by my grandmother in my childhood—"of two evils to choose the least;" and I acted under this influence when I invented a new support for my tent on going abroad. For the sake of lightness and capaciousness I took my chance of occasional annoyance from instability, which could only occur now and then, whereas its advantages would be continual. I do not recommend it to photographers who propose remaining in England, because in this country there is no difficulty in obtaining conveyances from one place to another; nor, indeed, did I *recommend* it to those going abroad. I merely stated a simple fact of my own experience, which other photographers might benefit by if they thought proper.

I believe I concluded the last communication I sent you with a reference to the advantage that an English photographer would enjoy in the French provinces, from the fact of his being a foreigner and alone. I presume, of course, that the photographer is a gentleman, and of good manners, as all those whom I have seen or spoken to on the continent have invariably been. His presence at a country house is, in that case, looked upon very frequently as an agreeable excitement, which amply compensates for any trouble his presence may occasion; and though it is a fact that many Frenchmen speak ill of Englishmen in general, yet I have invariably found them kind and amiable to the individual, as much so as we should be to a Frenchman under the same circumstances. At all events I have reason to thank many among the class of Frenchmen I have referred to, as well as their fascinating wives and daughters, for some of the best spent hours of my life; and I am happy to have this opportunity of publicly acknowledging the debt of gratitude I owe them through the medium of the "Photographic News." Perhaps, however, my visits have not been without effect in extending the practice of the art of photography; for, on more than one occasion, my host has been smitten by a most intense desire to become an operator; and when, by closely imitating me, he succeeded in getting a picture of his house not altogether unlike what it was in reality, he regarded it with as much enthusiasm as the boy did his bull-pup, of whom it is recorded in the diary of the P. C.,—otherwise parish clerk:—That mischievous boy, Tommy Styles, "having trained a bull-pup to the intent that he might join in the baiting of the bull at Easter, did desire his father, as he one day entered the yard, to fall upon his hands and knees and bellow like one bull, which, he doing, the boy did loose the pup, and the brute did seize the silly old man by the under jaw, and did hang on thereby, he trying to shake him off, and the boy to dance and cry, 'Bear it like a man, father, 'twill be the making of the pup!'"

There is one piece of advice which I may give to those whom I am now addressing, who, if they are not accustomed to French society, may misconstrue the meaning of the frank and cordial bearing of French ladies—and that is, to banish from their minds any ideas respecting them which they may have derived from French novels and plays, the writers of which represent inconstancy in a wife as almost a virtue, and their countrywomen as being in the habit of practising it very extensively. Let them be assured, that

women in France are much the same as women here; and that the conduct which would give offence to a sensible Englishwoman, would be not less likely to do so in the case of a Frenchwoman. I am the more anxious to impress this on the minds of my travelling countrymen, as I once had to spend three weeks at an inn with a friend, who had had the flesh on his breast ploughed up by a bullet, which had been fired by a justly-incensed husband in return for too pointed attentions paid to his wife—an indiscretion of which I am well assured my friend would not have been guilty but for the erroneous opinion he had formed of Frenchwomen from the cause above stated.

After this long digression, into which I have been led from the consideration, that the majority of photographers who go on the continent for amusement, and who take their camera with them as an additional means to that end, will prefer France to Belgium, I return now to the latter country; and I would strongly advise any photographer whose primary object is to obtain pictures, to visit Belgium in preference to any other country. The proximity of the various towns, and the railways that connect them, render travelling easy and inexpensive: neither is there any difficulty in getting chemicals from Brussels, in whatever part of Belgium one may be. Moreover, the communication with England is so constant and frequent, that there is no necessity for a man to carry about with him a lot of plates. When a sufficient number of negatives have been obtained in any town, they may be securely packed and transmitted to England, where they may be printed from at once.

I have already remarked, that Bruges offers very many objects worthy the attention of photographers; at all events, I found many more than I was able to photograph. The first which I took was of the market-place, at an early hour in the morning, when it was crowded with country people, who had brought in their fruit, vegetables, butter, &c. The curiously-shaped caps of the women, their short petticoats, and the picturesque character of one or two of the buildings, make it a very pretty picture, and one well worth preserving. The principal objects of interest to the photographer in Bruges are, the churches of *St. Jacques* and *Notre Dame*. The *Hôtel de Ville* is a handsome specimen of Gothic architecture, and is of a size which renders it easy to be taken in a camera of ordinary dimensions. The *Palais de Justice* offers a subject which is pretty from one point of view; but a larger and more interesting picture may be obtained of *Les Halles*, including the celebrated belfry. The lower part of this structure is used as a flesh market; and if the early morning be chosen for taking the photograph, this circumstance adds to the interest of the picture, as it gives it an amount of animation not to be obtained under other circumstances—the streets of Bruges, formerly so populous, being now almost deserted; this, however, is an advantage, rather than otherwise, to the photographer. I have frequently planted my camera in the middle of a street without having ever found it necessary to remove it on account of vehicles. Besides the buildings I have mentioned, there are very many others which, although they have no historical celebrity, make exceedingly pretty pictures.

The photographer, who necessarily possesses a certain amount of taste, will here find much to gratify it. Most of the churches, as well as one or two other buildings, contain fine paintings by Rubens, Van Eyck, Hemling, or other painters of note. During my operations here, I did not attempt to take the interiors of the churches, and therefore cannot say that such a proceeding would be allowed; but I am of opinion, that a polite note to the proper authority would obtain permission to do so; and, in this case, many pictures of great beauty might be obtained. VIATOR.

ON POSITIVE PRINTING.

SIR,—For printing positives, I find the following sensitising fluid for the paper the best and most economical I have ever used. As the formula was communicated to me without any reservation, I do not hesitate to give it for the benefit of those who may not have heard of it:—

80 grains of nitrate of silver must be dissolved in 1 ounce distilled water, and when dissolved, ammonia must be carefully dropped into it, until the precipitate is dissolved, and the liquid is quite clear. It must then be put into an 8 ounce bottle, and 7 ounces of alcohol added. It should be kept in the dark, and may be used over and over again to the last drop. The paper should be salted with about a 4 grain solution, by immersion, and, when dry, floated on the silver solution until the liquid comes through the paper, which it does very quickly; the dish must then be moved, so as to cause the liquid to flow evenly over the back. Air bubbles are seen at once, as the paper is quite transparent when in the bath. The papers are very sensitive, but will not keep long. I tone the proofs (after washing out the unaltered chloride) with an extemporaneous sel d'or bath; it is, I think, the safest and most economical plan for large proofs. I spread some of it evenly on a glass plate, and lay the proof, face downwards, on it for a minute or so, and then turn it up, and, with a glass rod, keep the fluid evenly over the proof till toned sufficiently. After slightly washing I put the proof in a hypo. bath, of the strength of 1 ounce to 10 of water. It must then, of course, be properly washed. Where there is plenty of water, I find a very useful washing apparatus may be constructed of a box, which should not be very deep, with the bottom removed, and a piece of calico strained across instead, on which the proofs must be placed *separate;* the top is made to go inside the box about half an inch, on to stops at the corners. It is pierced all over with holes, which spreads the water. The box is suspended to a tap, and the water passes through the proofs and the calico. The water must not be allowed to flow too fast, or the proofs will float about, and perhaps adhere to the top or sides of the box, and stick together.

Reigate. THOMAS BARRETT.

THE RASPBERRY SYRUP PROCESS.

SIR,—Is it possible that we have to record another article to the thousand and one already published, for the preservation of the collodion plate? I allude to the raspberry syrup published in the *Times*, and in your journal of last week.

Truly the art has no legitimate limits, but it appears there are "chemical reasons" for using that article. Now, sir, in common with the majority of amateur photographers, I am not a practical chemist, and I may be expressing the wishes of many when I say that I should like to know what those "chemical reasons" are. My knowledge extends no further than the use of the various articles named in works on Photographic Chemistry; but raspberry syrup not yet having found its way into those manuals, I shall have to provide myself with a work on "Domestic Cookery" to prepare for any contingency.

I have also an idea of commencing a series of experiments with *red currant jelly*, and endeavouring to discard the collodion film altogether, unless some of your readers can give me "chemical reasons" why I shall not be likely to succeed.

But, I would ask, is the laboratory to supply us with the ingredients which shall lead us on to perfection in the art, or are we to explore the precincts of the domestic cupboard? On the part of the female community I would object to any such invasion of their sacred territories—there are *domestic reasons* for such objections. But, sir, it is not sufficient to say that a new process is *equal* to any of the others; more than this is required; and I would not condemn that restlessness amongst photographers to discover some really good and sure means of preserving the collodion plate in a dry state; such a want does exist, but I would respectfully suggest to those who may be experimenting in this direction to bear two things in mind—viz., that the process must not require any special collodion, and must be equally as sensitive as the moist collodion plate; and, failing to produce

these results, in the name of all that is photographic, spare us the trouble of such profitless reading; for I think the space occupied in the descriptions of these various modes of manipulation could be filled with matter of much greater advantage and interest to the general reader.

Bradford. J. H.

STEREOGRAPH *v.* STEREOGRAM.

SIR,—Will you suggest that stereo*gram* is incorrect? Tele*graph* has, in our day, been properly altered to tele*gram*, being a thing of words; but stereo*graph* is a delineator as is photo*graph*. Were *gram* correct it might, with equal propriety, be called photogram; which, if attention be not called to the point, we may not be unlikely to see.

Yours, &c., SOL. HYPO.

[We have purposely introduced the word "stereogram" to designate a stereoscopic picture, instead of stereograph, as this latter word would more properly belong to an *instrument* whereby stereograms are taken (in fact such an instrument has been described under that name), and the analogy of other English words, such as telegraph, perspectograph, &c., would thereby be preserved. With respect to the word photogram, the introduction of which our correspondent seems to regard with such horror, we can inform him that some of the first scientific men in England have, for some time past, been in the habit of using that word. We fear that *photograph* is too strongly rooted in the language to be supplanted by photogram, but we should not be sorry to see the barbarism stereograph nipped in the bud. In all words compounded of a substantive and a derivative from the Greek word γραφω, it should be borne in mind that "graph," the derivative from the present tense active of γραφω, cannot be properly applied except as signifying the agent or instrument that performs the act. Anemograph, from ανεμος, wind, and γραφω, to describe; actinograph, from ακτιν, a ray of the sun; thermograph, from θερμος, heat, &c., &c., all signify the indicator and not the thing indicated. "Gram," on the other hand, a derivative from γεγραμμαι, the perfect passive of γραφω, should always signify the thing described or indicated, as: telegram, the notice given by the telegraph; photogram, the likeness described by the photograph; stereogram, the effect produced by the stereograph.]

Photographic Notes and Queries.

HINTS TO BEGINNERS.

SIR,—The future of photography is very encouraging. The "good time" seems to be coming. If every amateur who reads the "PHOTOGRAPHIC NEWS" is only half as thankful to you as myself, you will receive something more useful and substantial than thanks, in the hearty recommendation and extended circulation of the work. It has been admirably well-timed, and if you go on as you have begun, keeping as closely as possible to the practicable and the useful, you will be sure to succeed.

Thanks are due, and I have no fears but that they will be very generally expressed, to Mr. Fox Talbot for the liberal manner in which he has enabled you to make known his newly-discovered process of photoglyphic engraving. The pictures are wonderful; not only in the sense of being first specimens, but as having been produced in the way the inventor has so simply described. It is worth a "note" that Mr. Fox Talbot's specification contrasts favourably, on the side of common sense, with the generality of such documents.

Now permit me to say a few words to the many amateur workers, who are looking up to you for counsel and assistance. As the result of my own experience I advise them to trust less to books and more to themselves. Perhaps, I have read as much upon photography, during the last four years, as any one in the United Kingdom; and whilst I by no means intend hereby to discourage the reading and studying of what others have to say, I still maintain that not one amateur photographer in a hundred will become even moderately successful if he follows too literally the instructions contained in books. In saying this it is far from my intention to underrate the knowledge, or doubt the veracity, of any of the writers upon this subject. Each is undoubtedly right in his own process, and in the sense in which he manipulates. But unless many of the processes can be seen from first to last in actual operation, I believe it to be almost, if not quite, impossible to imitate them from ordinary written instructions. There are some exceptions, and they are *only* exceptions.

During a long period of failures, and vexations, and disappointments—the common lot of most beginners in the beautiful art of photography—I many times thought it would be the best plan to burn all my photographic books, pamphlets, and other forms of instruction. Without being quite so rash, I did the next best thing—put them into a cupboard, and referred to what are considered the best authorities, only in cases of extreme difficulty. By applying the knowledge I had previously attained, by asking a question, as opportunity offered, of a person wiser and more skilful than myself, and by exercising what is implied in that (vulgar?) expressive word *gumption*, I am now able to take a good (negative) portrait, and print it clear, and bright, and durable. What I have accomplished under many disadvantages, with only a few scraps of leisure, and amidst interruptions of weeks and months in duration, others, more favourably circumstanced, ought to do a great deal more. And yet I know persons who have been at work at photography a longer period than myself, with first-rate apparatus, a greater amount of leisure, and many appliances which I am not likely to possess, who have never produced a picture worth looking at, and seem as far off from doing so as they were three or four years ago.

There must be a *cause* for continual failures. I don't believe it is always to be set down to unskilfulness. If no one else will try to explain the cause, I will do what I can myself.

This has been rather a long "note." I conclude with a few "queries."

Is there any simple and really good plan for producing a halo upon the collodion negative? (I have seen, I believe, all the suggestions hitherto offered, some freely and others for money, but I don't think one of them *simple* and *good*.)

Is there any improvement in what are called the *vignette* glasses? These are perfectly useless without cotton, wool, and other contrivances, which occupy much time and often fail of their object.

In fitting up, say, for the ensuing spring, a new glass-house for taking portraits, what is the best colour for the inside of the house, for the back-ground (negative process), and the curtains and blinds? * * * *

November 15*th*, 1858.

ARTIFICIAL LIGHT FOR PHOTOGRAPHIC PURPOSES.

SIR,—In a previous letter signed "Subscriber," which you did me the favour to insert, I referred to a new artificial light invented by the Honourable Major Fitzmaurice. I have since received from that gentleman some particulars respecting the light, and having obtained his kind permission to communicate his statement to you, I beg to inclose a copy of it, believing that it will be read with much interest.

H. D. H.

"The light is adapted for every purpose, from a table lamp to a lighthouse. I have had my own portrait taken by photography by it, and I am applying it to every kind of purpose.

"I can burn an ordinary lamp, equal, by photometer, to two of the *best* French carcel lamps, or to four gas burners, at the rate of ½d. per hour.

"I had a trial at Paris, last week, with the full power light against 444 gas burners in a drawing room 145 feet by 45 feet and 35 feet elevation, and with *one* light, I could read any newspaper with perfect ease from one end of the room to the other. The cost of these 444 burners at two hours per evening, came to 6 centimes for every burner, or about 2,300 napoleons per annum. *Two* of my lights do not come to 60 napoleons per annum, giving a light exceeding these 444 burners. This appears almost incredible, but I took the data from some of the first chemists in France, who were present. With a single lamp you can read your watch perfectly at 600 or 700 yards. A company are purchasing my interests, and will shortly publish their mode of working."

VARNISH FOR NEGATIVES.

Sir,—I shall be much obliged if your correspondent, who signs himself "One of Devon," in the last number of the "Photographic News," will be so good as to reply to the following questions relative to his communication. Is no retarder used, in the form of either acetic, or citric acid, in any of the processes? Is no free nitrate of silver employed in the development of the picture on the dry collodion film, and how long does it require with gallic acid instead of pyrogallic acid? Does the dry collodion film bear the subsequent treatment and washings without disturbance, as, in the various collodio-albumen processes, this is one of their greatest merits?

In reply to your correspondent, signing himself "Lucius Veritatus," I would recommend him to use plain gum (arabic) water, about the consistence of syrup, instead of a spirit varnish for glass positives; indeed, I find it answer very well for all the purposes of a spirit varnish. As a protector of the collodion negative it should be used immediately after the last washing, and the picture dried in the usual way, as quickly as if without the gum; and, if necessary, to make it quite dry and hard before a fire, or over a lamp, or candle. Or a solution of gelatine, previously warmed to liquify it, might be used in the same way, with, perhaps, less risk of accidental injury from moisture, &c. E. T.

Brighton.

SUBSTITUTE FOR A GLASS ROOM.

Sir,—I trust you will excuse an entire stranger's addressing you upon a subject mentioned in an early number of the "Photographic News;" I allude to the query about taking portraits in a tent of calico, and rendering it waterproof. As expense is, of course, of great consequence to many who would like to pursue this interesting art, I would suggest that I believe fine white calico, saturated with a solution of white wax in pure turpentine will be found to answer very well.

I have only paid attention to photography for the past twelve months. I was induced by a friend in London to attempt it, and my princial motive was to obtain portraits of my friends—especially naturalists, having given up most of my leisure time to natural history, especially entomology. I have succeeded in my calico tent far better than I expected, and if you would like to see one or two specimens taken in it, I will, with pleasure, send them to your publishers.—Yours very truly, Henry Doubleday.

[We shall be very pleased to see the specimens alluded to by our correspondent. If he will kindly forward them as he proposes, carefully packed, we will take every care of them.]

WHAT TO AVOID IN PHOTOGRAPHY.

A correspondent, K. S. T., has suggested to us the collection of some short notes under the above title. As a first instalment we append the following; and if our readers approve of the idea, we will gladly find a corner for similar contributions each week:—

Do not have more light in the dark room than you can conveniently work by.

Do not let the positive paper exciting bath become alkaline.

Do not use pyrogallic developing solution when it has become brown.

Do not, as a rule, redip the plate in the bath before developing.

Do not use collodion before it has well settled.

Do not work with a turbid nitrate bath.

Do not filter silver solutions when allowing to settle and decanting them will do equally well.

Do not allow much time to elapse between exciting and exposing the plate.

ANSWERS TO MINOR QUERIES.

The Positive Printing Process (vol. i. p. 86).—*J. D.* has sent some specimens and several queries on the above process. The substance of the questions seem to be—1. As to obtaining vigorous blacks. 2. The silver solution becoming discoloured. 3. Throwing away the solution of gold. 4. As to the bath for negatives.—1. The chocolate colour of the print is occasioned by not leaving the print quite long enough in the gold solution. To produce a deep black, the action of the gold should go on until the print is decidedly purple in tone; then the fixing operation removes all the blue inky appearance (if it has not been much too long in the gold), and gives it a slightly reddish-brown look; but, on the print, when nearly dry, being ironed with a hot smoothing iron, the black will become clear and decided. Of course, in exciting, the paper should be four or five minutes in the bath, as that also makes the tone blacker and better. 2. The silver solution always becomes discoloured, but it does not affect the result at all until it grows to an *inky* blackness. A teaspoonful of kaolin (*level* full) added to 3 or 4 ounces or more of the solution, well shaken up, and left a few hours in the light, will clear it at any time; then filter through blotting paper. Often, however, a scum forms on the top of the liquid, which may be removed by dragging a bit of paper along the surface, when the scum will cling to it. 3. The solution of gold may be kept, and a little fresh gold added now and then; but as one may easily measure the quantity (or very nearly so), we recommend every one to use it fresh, as we think it works much better. 4. As to the order that the bath is in, we think the print speaks well; for the appearance of the blacks and white show power enough to print clean, as also to give the detail in the dark shades. The bath should be very slightly acid, the pictures are then cleaner.

Putting together a Portrait Lens.—*X. Y. Z.* dismounted a double combination lens for the purpose of cleaning, forgot the arrangement of glasses, and since then has not been able to put them properly together again. *X. Y. Z.* should have sent us some data as to the different focal lengths of the various glasses, as the answer would have been thereby rendered less difficult: we will, however, give him and our other readers as much general information as we think will be useful to any unfortunate photographer who may happen to have thrown his portrait lens into a state of "pie." We will suppose the portrait combination to be of the usual construction. The first step will be to give each crown glass its own flint glass achromatiser. Each of the crown glasses are double convex. One of the flint is either plano or double-concave, and the other is concavo-convex; *both*, however, are dispersing lenses: call the former, No. 1 flint, and the concavo-convex, No. 2 flint. Now take one of the crown glasses and place it next to the most concave side of No. 1 flint; roughly measure the focus of the compound lens, and put it down; do the same with the other crown glass, placing one of its sides in contact with the concave side of No. 2 flint, and measure the focal length of that pair; afterwards exchange crown glasses, and repeat the measurements of the foci. That arrangement of crowns and flints which gives the *least* difference between the foci, is the proper order in which they are to be united. That found, call the crown which is with No. 1 flint, No. 1 crown, and the other No. 2 crown. Take Nos. 1 crown and flint and place them together, so that the least convex surface of the crown is in contact with the most concave surface of the flint, and arrange them so that they form the front combination—the crown being outwards and the flint inwards; and then arrange the Nos. 2 crown and flint, so that the most convex surface of the crown is next to the concave surface of the flint lens. These, however, do not usually touch, as a

ring of brass is inserted between them. The crown glass should form the outer one in this combination also. Most frequently, however, the front pair of lenses, having their contact surfaces ground to similar radii, are cemented together with Canada balsam, so that the above process may be considerably simplified. *X. Y. Z.*, and others in a similar predicament, will find it advantageous to take a pencil and a sheet of paper and make a rough sectional diagram of each of the lenses, and see that they fully understand the above description before attempting to put it into practice.

ALBUMEN FOR THE COLLODIO-ALBUMEN PROCESS.—*Clericus.* A good formula is the following :—

White of egg (very fresh)	2 ounces.
Distilled water	2 ounces.
Strong solution of ammonia	10 drops.
Iodide of ammonium	12 grains.

Put into a large bottle, and shake for some time; then allow it to settle, and filter through a sponge. Place in it a piece of camphor the size of a pea, and it will keep good for six months. We hope shortly to lay before our readers a detailed account of the collodio-albumen process, with all the latest improvements both in manipulation and formulæ.

FIXING POSITIVES WITH BROMIDE OF POTASSIUM.—*Paper* informs us, that he knows of positives on albumenised paper having been fixed for several years with bromide of potassium, and he has never heard of one fading. Mr. Talbot originally recommended bromide of potassium, in the proportion of about 10 grains to the ounce of water, for fixing both negatives and positives; and we have seen pictures fixed in that way which have shown no signs of fading after many years. The objection seems to be, that the bromide of potassium does not dissolve the undecomposed silver salt out of the paper, but merely destroys its sensitiveness to light, and therefore it was set on one side for the more theoretically perfect object, hyposulphite of soda; now, however, photographers are beginning to suspect the permanence of all hypo-fixed paper positives, it would be worth a trial whether a return to the original bromide of potassium fixing would not possess some advantages. The process is very simple :—Prepare the paper and expose, as usual, under a negative until the best visible effect is produced (do not over-print); then wash the silver from the paper in two or three waters, soak for ten minutes in a ten-grain solution of bromide of potassium, wash slightly in two or three waters and dry. The whole operation may be completed in twenty minutes.

TO RESTORE OLD COLLODION.—*T. K. S.* In addition to the method of restoring the sensitiveness of old collodion by the addition of a piece of metallic silver, zinc, or cadmium, a correspondent has informed us that, if a few clean iron filings are shaken up with about enough collodion for one day's work, the iodine will unite with the iron, forming protoiodide of iron, and the sensitiveness of the collodion will be very much increased; it will not, however, keep for more than a day.

AMBER VARNISH.—*Iodide* asks how amber and chloroform varnish is prepared. Put one part of finely-powdered amber, and one part of clean-washed sand, into a bottle with eight parts of chloroform; allow it to stand for some days, shaking occasionally; strain through muslin, and squeeze the liquid from the interstices of the spongy residue of the amber and the sand; then filter through bibulous paper. The best place to procure pure amber is at large tobacconists, or meerschaum importers; broken mouthpieces of pipes may be procured there of any desired purity and at about two shillings per ounce. We do not much like amber varnish as it is so easily scratched.

PINS FOR HANGING UP PAPER.—*J. Jones.* Purchase a box of fine French hair-pins, bend one of the prongs back about half way, so as to form a hook, and pierce the corner of the paper with the other prong; the paper will thus hang in the original angle which is protected with varnish. The hook bent in the other prong can be hung over a stretched cord.

TO CORRESPONDENTS.

W. L. THENDINGWORTH.—H. E. R.—James S.—Th. So.—No. 26.—Liberty.—A Sincere Friend.—A. B. C.—An Ex-member of the Council.—No Monopoly.—M. H.—W. S. C.—Subscriber.—Photo. :—We are very thankful to our correspondents for their friendly wishes; but, having treated the subject somewhat at length in our Leader, it would not be right to occupy our columns with further comments on the subject.

C. E. W.—See vol. i. p. 72. A ½-plate camera and portrait lens will be required. For expense, consult our advertising columns.

H. S. N.—We believe they are imported from France; but do not know any further particulars.

K. S. T.—Such stains are rather common with Fothergill's Process; read the report of the Manchester Committee in the present number. The great advantage of the collodio-albumen process is, that such stains as you complain of may be removed by slight friction, without injury to the picture. Try a little more acetic acid in your developing solution. We are much obliged by your suggestion; and have, as you will see, made use of it. We shall be glad of further contributions.

F. M. Y.—No. The light must first pass through the picture to be copied, before it falls on the plate.

J. M. D. P.—No portraits have, to our knowledge, been taken by gas-light. The time usually taken by the artificial lights is from 10 to 20 seconds. The funnel can go into the chimney. Try it.

CHUBB.—It would be impracticable for us to have anything to do in the matter.

C. WARRINGTON.—Your bath is in a hopeless state; extract the silver from it, and make another.

AN AMATEUR, P.—Supposing you succeeded in taking good pictures on the steel or copper plate, it would require rather extensive apparatus, and a certain skill, to print off good impressions.

A VETERAN.—Try the varnish given in the present number.

SUBSCRIBER, AND AMATEUR, D.—We will give the process in an early number.

PAPER.—We have heard that if re-sensitised it will restore it to its original condition, but we have never had occasion to try.

B. MAYNE.—1. Cadmium collodion will keep good for many months. 2. See the note on the subject in the present number. 3. In our next. 4. In an early number. Gutta percha will dissolve in benzol or chloroform.

J. T.—You should have allowed it to dry a little before heating it over the spirit lamp. The solution must be kept in the dark.

M. E. WHITE.—Your first two requests shall be attended to. We shall be very pleased to receive a description of your field box. Many amateurs are not successful with the dry processes, and anything which tends to simplify wet collodion in the field will be a boon to them. Ordinary gas or lamp light will not do for portraiture. The success which attends the use of the artificial light mentioned from time to time is rather uncertain. Letters to the Editor must take their course. We cannot set aside our numerous correspondence to satisfy the impatience of one individual. Had your business letter been sent to the publishers, it would have met with prompt attention. Only two of your letters have reached us, 14, and 21.

J. C.—The ordinary negative developer with pyrogallic acid; expose a little longer.

T. BARRETT.—The photoglyphs shall be sent. Your enlarged pictures are very good; we should like to have an account of the process by which they were obtained. We will endeavour to arrange the formulæ as you suggest.

INQUIRER.—The oxyhydrogen light does not contain a sufficient volume of the chemical rays of light to make it available for portraiture; it would, besides, be far more expensive than the pyrotechnic lights which have been given in previous numbers.

C. W. W.—Your bath is spoilt. Reduce the silver, and make a fresh one.

DA LUCEM.—The method of imparting the peculiar glaze to the stereoscopic pictures you allude to, is kept a secret. It is a rather complicated and difficult process. Oxgall will make the colours lay evenly on albumenised paper.

W. J. W.—Answered in this number.

W. G. G.—1. Positive collodion is usually thinner than negative. 2. Chloride of gold does not *spoil* by keeping, it merely attracts water from the atmosphere, and dissolves. The best plan to keep it is to dissolve it in a known quantity of water, so that, for instance, 1 drachm of water should contain 1 grain of chloride of gold. 3. Consult previous numbers. 4. Just below a red heat.

ENAMELLED IRON TABLETS.—The manufacturer or agent of these tablets will find it advantageous to advertise in our pages, as many correspondents have inquired where they are to be obtained.

H. V.—1. The lenses of a magic lantern are usually of too inferior a quality to employ for photographic purposes. 2. Wash well before fixing.

ANTI-HYPO.—Arrangements are not yet completed for giving the public the full benefit of the art.

A REGULAR SUBSCRIBER.—We are obliged by your correction. It shall be attended to.

E. S. H.—We will give the subject early and careful attention. Can you, to facilitate our experiments, give some further information about this mode of manufacture,—what they are made of, sized with, &c.?

E. A. P.—The quantity of camphor to be added is quite optional. Put in a piece the size of a pea.

H. B. SWANSEA.—The specimens which we saw were very good. We have made further inquiries respecting "One of Devon's" process, and hope to be able to answer your other queries in an early number. The Almanack shall be sent.

W. H. H.—Cerolein is that constituent of bee's wax which is soluble in cold alcohol. It is a greasy body, to which the colour, odour, and tenacity of the wax are due. It constitutes about five per cent of the wax. Its solution in alcohol has been employed for preparing paper. The "Turpentine Waxed Paper" process, which we shall give in an early number, is an improvement on it.

Communications declined with thanks:—J. G.—X. A.—Thomas M.—Hypo.—A Subscriber.—J. C. C.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—An Enquirer.—T. Clark.—Ambrotype.—A Subscriber at Paisley.—J. T.—Photo.—Six.—W. W. W.—Stereo.—F. A. B.—C. E.—Pyro.—An Amateur.

IN TYPE:—A. B.—Aggrieved Spirit.—H. T. T.—A Foreigner.—W. H. W.—W. G.—Iodide.—W. McC.—R. W.—G. W. H.—A Gilder.—E. D.—G. N. B.—C. F. B.—H. C. J.—J. C. S.—Sen. Sol.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 13.—*December* 3, 1858.

THE COLLODIO-ALBUMEN PROCESS.

If this beautiful and very certain process were in danger of being buried and forgotten in the more recent discovery of Mr. Fothergill, the late report of the Manchester committee must at least induce those who have time and opportunity to try both, and draw their own inference as to the results. I have, myself, worked every process—if not every modification of every process, and my old faith is yet unaltered, that the *best results* of each are almost, if not utterly, indistinguishable, and two good photographers would be of different opinions as to the kind of negative from which some prints are taken. I know that many will differ from me. I will, however, mention one instance to support me, and that is, Leverett's waxed paper views, which were at the Exhibition of the Art Treasures last year. Generally this process has the least decision and sharpness of any, yet his "Stutton Park," and many others, were not less beautiful in *any way* than the very best glass pictures there. With this faith, the question of what process to use seems to me to appeal for its answer to *ease of preparation* and *certainty;* in the latter, at least, collodio-albumen cannot possibly be excelled, and if the preparation appears to be complicated, and to take a longer time, I think that, if we examine both, we should come to the conclusion that at least it is quite as *convenient* as Fothergill's, if not more so. Doubtless a thousand voices will be raised to contradict this statement; but they forget that *all* the preparation of Fothergill's must be begun and finished at once. Now in the other process a man, even after business hours, might prepare thirty or more plates as far as the first stage, and leave them in this state until dry, when they would keep any length of time; and then it is easy to prepare twenty for the camera, whilst another man using Fothergill's prepares five or six. Is not this an advantage that has ever been overlooked? I, myself, generally have sixty or eighty large plates ready for the last bath, and I have never found the last used any way inferior to the first. One advantage, and one only, I have observed in Fothergill's, and that is indisputable—the time of printing is slightly reduced, as the light is made less powerful by the albumen coating being rather thick in the other. As this description is intended for *beginners* as well as *photographers*, the latter must excuse the minuteness of the directions, which naturally range themselves as follows:—

1. The kind of glass, and how to clean it.
2. The collodion, and how to prepare the albumen.
3. How to apply both.
4. The bath, and application when preparing for the camera.
5. Exposure.
6. Developing the negative.
7. Fixing, washing, and varnishing.

1st.—The glass, and how to clean it, is the first stage of the operations; and here I must caution the operator against being persuaded to go to the expense of "patent plate," or other extravagant description of glass. I know the glass-trade *well*, and if a man asks for *good* "16 *ounce sheet*" at any respectable dealers, he will have a flat plate quite good enough for any description of negative, and the price is not one fourth of that which he must pay for "patent plate." The new sheets need no cleaning, but well washing with soda and water—of the strength of one ounce of common washing soda to about a quart of water; but if the plates have been used before, put any quantity of them in a vessel of *hot* water and soda of the same strength as above, leave them from one quarter of an hour to an hour, and then the film will readily come from the glass. After this, with a little bunch of linen, dipped first in a strong (say one part to four or five parts of water) solution of cyanide of potassium, and then in rotten-stone prepared for the use of the kitchen, rub the plate well, throw it into a large vessel of water, and when all are in this, well wash and wipe. I feel a little unwilling to recommend this mode, as it involves the use of the deadly poison cyanide of potassium; but as every man who photographs must necessarily use what we call dangerous chemicals, I can only caution the beginner. And this method involves less trouble, and is more certain than any other that I have ever tried. When used the plates must be perfectly dry, otherwise blisters, or the leaving of the film, are inevitable.

2nd.—Part of the process is the choice of collodion, and the preparation of the albumen. As to the collodion, I have tried but few makes; my experience is, that with many of the kinds sold as positive collodion it is utterly impossible to work, as they crack when dry, or the film leaves the glass in developing. Those prepared for the dry process alone should be used. I recommend no particular makers; I have never had but one blister out of many hundreds of large plates.

The albumen should be taken from as fresh eggs as can be procured. The germs being removed, it should be prepared as follows:—

Albumen	1 ounce (by measure).
Distilled water	¼ " " "
Liquor ammoniæ	10 minims.
Iodide of potassium	5 grains.
Bromide "	1 "

Dissolve these salts in the distilled water, and add to the solution a minute portion of iodine, so that it may have a decided yellow tone (this is advisable, as sometimes there is free potash in the iodide, which causes minute holes in the blacks of the finished picture); then add to the albumen, and beat well with a silver or wooden fork, or by any other of the numerous methods used. That which I find the simplest and perhaps the best method is, to take a handful of small gravel, very well washed, and to put it, with the albumen, &c., into a strong bottle, shaking it well for ten minutes or a quarter of an hour; by this means the albumen is beaten enough to flow easily. Let it stand twelve, or, if not wanted, twenty-four hours; then filter through fine muslin, and it is fit for use.

This will keep a long time. I have had it for months, and my pictures were as good with it as with the newly-mixed. *To keep*, however, it should be in a stoppered bottle with a lump of camphor floating on it; and when about to be used, it should be filtered through fine muslin as at first. The next stage is—

3rd.—To apply both, a plate-holder is indispensable—the *Globe Pneumatic holder* is decidedly the best and most easily used. In this place it is as well to describe the method of making the silver bath, as but one is used for both collodion and albumen:—

Nitrate of silver (pure)...	35 grains.
Glacial acetic acid	10 " (or minims).
Distilled water	1 ounce.

To saturate this with iodide of silver, which must be done, the most ready method seems to me to be coating a plate with collodion and leaving it in the bath a few hours; it is then fit for use. Take up the plate with the "holder," and pour

into the centre a body of collodion, so that it may flow freely over the surface, and pour it off at the corner nearest you back into the bottle; then move the plate a little to and fro in order to erase the streaky look which it would otherwise have; let it set *well*, and lower into the bath without a stoppage, else a line, at that part, will be inevitably formed across the plate; leave it a minute; then lift up and down once or twice to wash away, as it were, the streaky appearance of the iodide surface, which will seem greasy; take out; let it drain a little into the bath, and then wash well. My method is as follows:—I have two or three large vessels of water, and put the plate in the first; whilst another plate is in the silver bath I remove the last plate from the first to the second; and if I use three (as I do for large plates), so into the third; then with a jug of water I wash the plate well; lay it to drain for a minute; wipe the back, just to take off the little spots and drops of water which settle there, and pour on and off, three times, the prepared albumen. I must also explain how I do this. Many operators say that, for my size of plates—$9\frac{1}{2} \times 7\frac{1}{2}$—an ounce of albumen must be used to each. Long ago it seemed to me, that the expense for a great quantity of large plates in albumen alone would be half as great as in collodion—as an ounce of collodion will coat three or four plates, 9×7, if not more; so I tried using, say two ounces of albumen for two plates; then in another vessel I put two ounces of fresh; and on each plate I poured, first, the used albumen, which carried off most of the water, and then I used the fresh quantity twice; so I did for five or six plates, and then I threw away the first used, and in its stead put the other two ounces, and poured out two from the unused albumen to use last again. By this means a great saving is effected, and the results, in my hands, are as good. Most operators, however, use fresh albumen each time—an ounce to each plate, 9×7 or 10×8. After this, the plate must rest on the corner, if possible, to dry, and should not be moved until it is dry, as this causes waves and uneven marks upon the surface. When quite dry—*and not before*—the plates are ready for,

4th—The bath, &c., when preparing for the camera. The same bath as before is used when exciting for the camera, but this part of the process may be deferred to an indefinite time *if the plates are kept dry*, and light does not affect them in this stage if they have been washed well. When, therefore, the plates are wanted for use, they must be again immersed in the bath for at least one minute, but not longer than two or three, and washed as before. Again they must be dried before using; as, if they are dried in part only, the development will be uneven and in dark patches; however, in a warm room they dry very readily, especially if we wipe off the wet from the back. When dry they are fit for the 5th stage—The exposure.

(*To be continued.*)

DRY COLLODION.

BY P. C. DUCHOCHOIS.

Every photographer knows how difficult it is to find a collodion suitable for the collodio-albumen, gelatine, or meta-gelatine processes, *i. e.*, a collodion giving a film neither tenacious nor contractible, but very porous, friable, and adherent. Old collodions are recommended as possessing such properties, but, besides that they are often too much iodised for that purpose, it is to be remarked that, if the collodions prepared with alkaline iodisers answer very well, those iodised with metallic salts (cadmium generally) do not always work as well, for although the collodion becomes coloured, the film keeps for a long time all the characters of the collodion one or two weeks old.

Believing, from observation, that the alkaline and metallic bases reacted on pyroxyline in different manners, desirous to explain that fact, and also to have a formula by which I can surely prepare good collodion for the dry process, I made the following experiment to study the action of alkaline bases in collodion:—

To a plain collodion giving a thick strong film, very contractible, and easily lifted up in long rays, I added liquid ammonia; immediately it was troubled, and, after a few hours, gave a thinner film, very porous, rotten, and opaque; it took twenty-four hours to clear up, became a fine amber colour, and left a white precipitate of decomposed pyroxyline (cellulose). Caustic potash and caustic baryta in small quantity acted nearly in the same way. Hence, alkaline bases react powerfully on pyroxyline, *it is disorganised, and a part is decomposed.*

This is very important. It explains—1st. The great fluidity of collodions prepared with alkaline iodisers (particularly when iodide of ammonium is used), and, partly, their instability. 2nd. Why those collodions give a film with less and less body, and the causes of the want of success resulting from it. 3rd. The advantage of alkaline collodion for Taupenot's and Norris's processes, and, generally, for all dry preparations on collodion. It will be observed that the amount of ammonia added to the plain collodion ought to be proportioned according to the kind of pyroxyline, that is, to the more or less tenacity or contractibility of the collodion, and that ammoniacal collodions cannot support as much iodiser as other ones—4 grains to the ounce is a good proportion for the collodio-gelatine process, and 2 grains are enough for the collodio-albumen.

But since it is easy to prepare a collodion with all the proper qualities for dry preparations, I have adopted a truly dry collodion process (without any kind of preservative coat) which is very sensitive, and has the advantage of great simplicity. The preparations are—

COLLODION.

Ether concentrated	6 fluid drachms.
Alcohol 95°	2 " "
Pyroxyline	5 grains.
Iodide of ammonium	4 "
Liquor ammoniæ	3 drops.

SILVER BATH.

Water	1 fluid ounce.
Nitrate of silver	27 grains.
Dilute acetic acid	2 drops.

DEVELOPER.

Gallic acid	1 ounce.
Alcohol	4 "
Dilute acetic acid	1 drachm.
Camphor	15 grains.

After sensitising, immerse the plate in water for three or four minutes, and having washed it with distilled water, let it dry in the dark. To develop—first wet the collodion film with water, and then spread upon it a mixture of 1 drachm of the developer, and 3 or 4 ounces of water, afterwards add a small quantity of a solution of nitrate of silver, at 3 per cent., to strengthen the negative. Fix with hyposulphite of soda.

As it has been said, this process is very rapid, and the failures often arise from an excess of exposure; if it is too long, the sky does not blacken, the picture is too equal, and does not take enough intensity in the high lights.

BALLOON PHOTOGRAPHY.

Pending the reproduction of colours by means of photography, a mode of accomplishing which has been said to have been discovered five or six different times already, pending also the vulgarisation of the different economical printing processes guaranteeing their permanency, which are yet but in the condition of laboratory experiments, processes which shall advantageously replace, at a given moment, engraving and lithography,—novel experiments are rewarded by the most curious results. Not a very long time has elapsed since the English journals announced the *chef-d'œuvre* of photographic instantaneity—a shell taken in the air at

the moment of its explosion. Bird's-eye photography had not yet been attempted, although it is about to be. M. Nadar, who, by dint of care and ability, has succeeded in producing those magnificent proofs which have the appearance of Rembrandt etchings, made on Sunday a preparatory ascension in the Godard balloon, in which he studied the necessary conditions requisite to insure the success of this first attempt at what may literally be termed "bird's-eye" photography. . . . . M. Nadar proposes to make attempts alternately in free and captive balloons.

Balloons have been, as is known, employed for purposes of strategy during the wars in Germany, Belgium, and Egypt. Photography, hereafter aerostatic, may render great services in the taking of ground plans, hydrography, &c. There is no necessity for us to insist on the importance of this scientific event.—*Moniteur.*

STEEL-FACING COPPER PLATES.

SOCIETY OF ARTS.—*Wednesday, November* 24, 1858.—GEORGE T. DOO, Esq., R.A., F.R.S., in the chair.

THE following paper, and the discussion thereon, which we have quoted from our contemporary, "*The Journal of the Society of Arts,*" appear of such importance to the photographic world, now that attention is being so strongly directed towards the obtaining photo-engravings on copper or other plates, that we have inserted it in as complete a form as the space at our disposal would admit.

The paper read was "On a method of rendering engraved copper-plates capable of producing a greatly-increased number of impressions. By F. JOUBERT."

After giving a historical account of the rise and progress of the art of engraving, the author proceeded:—

"The last century produced many engravers of great merit, and in this country foremost amongst them are Hogarth, Sir Robert Strange, and James Heath. The excellence of their works gave rise to such a demand for print impressions of engravings, that some forty years ago, when it was found that a copper plate could not yield a sufficient number of impressions for the demand, steel plates were introduced, for small plates only at first, and several editions of books were published containing plates most elaborately engraved on steel.

"Subsequently, when means were found to obtain a large surface of steel of pure quality, this metal was adopted for the style of engraving known as mezzotinto, which is now practised on steel plates, the result being a much larger number of impressions obtainable as compared with the old copper plates; but historical or line engraving for important subjects was still entirely practised on copper, when the discovery of the art of electrotyping took place, towards the year 1838.

"Several line engravings on copper were then multiplied by this process; the result, however, was only attended with partial success, in consequence of the soft quality of the copper so deposited, which will yield but a very limited number of good impressions, and soon wears away; this caused the process to be almost abandoned for artistic engraving, but for commercial purposes it is still practised extensively, and has been often successfully applied in cases where a large number of impressions is not required.

"Under the circumstances which I have described, it had become a desideratum to harden, if possible, the surface of a copper plate, and to protect it from wear while printing; but it is only lately that this important object has been attained.

"In March last, my friend M. Jacquin, of Paris, took out a patent in this country for a method of coating plates with iron, which had already been successfully applied in France, and of which the merit is due to my friend, M. Henri Garnier, of Paris.

"I have myself had the advantage of co-operating with M. Garnier in the development of the invention, the principles of which I shall now proceed to describe:—

"If the two wires of a galvanic battery be plunged separately into a solution of iron, having ammonia for its basis, the wire of the positive pole is immediately acted upon, while that of the negative pole receives a deposit of the metal of the solution—this is the principle of the process which we have named 'acierage.'

"The operation takes place in this way: By placing at the positive pole a plate or sheet of iron, and immersing it in a proper iron solution, the metal will be dissolved under the action of the battery, and will form hydrochlorate of iron, which, being combined with the hydrochlorate of ammonia of the solution, will become a bichloride of ammonia and iron; if a copper plate be placed at the opposite pole and likewise immersed, the solution being properly saturated, a deposit of iron, bright and perfectly smooth, is thrown upon the copper-plate, from this principle:—

"Water being composed of hydrogen and oxygen;

"Sal ammoniac being composed of

"1st. Hydrochloric acid containing chlorine and hydrogen;

"2nd. Ammonia, containing hydrogen, nitrogen, and oxygen;

"The water is decomposed under the galvanic action, and the oxygen fixes itself on the iron plate, forming an oxide of iron; the hydrochloric acid of the solution acting upon this oxide forms a hydrochlorate of iron, whilst the hydrogen precipitates itself upon the plate of the negative pole, and, unable to combine with it, comes up to the surface of the solution in bubbles.

"My invention has for its object certain means of preparing printing surfaces, whether for intaglio or surface printing, so as to give them the property of yielding a considerably greater number of impressions than they are capable of doing in their ordinary or natural state. And the invention consists in covering the printing surfaces, whether intaglio or relief, and whether of copper or other soft metal, with a very thin and uniform coating of iron, by means of electro-metallurgical processes. The invention is applicable whether the device to be printed from be produced by engraving by hand, or by machinery, or by chemical means, and whether the surface printed from be the original or an electrotype surface produced therefrom. I would remark that I am aware that it has been before proposed to coat type and stereotypes with a coating of copper, to enable their surfaces to print a larger number of impressions than they otherwise would do; I therefore lay no claim to the general application of a coating of harder metal on to the surface of a soft one, but my claim to invention is confined to the application of a coating of iron by means of electricity on to copper and other metallic printing surfaces.

"In carrying out the invention the solutions of iron employed may be varied, and such is the case in respect to the arrangement of the galvanic battery or other source of electric currents used; I do not therefore limit the invention to the means hereinafter described, but I believe they will be found to be the best for the purpose.

"I would further remark that it is important that a ferric solution should be employed which will not dissolve or corrode the plate intended to be coated, for if it be attempted to use such a solution, though the iron will be precipitated, it will not only be in a non-coherent state, but the engraved surface itself will be liable to be attacked and injured. It may also be remarked that the coating of iron admits of being removed from a printing surface of copper without injury to the original plate, hence the original plate may, after being coated and used for some time, have the worn coating removed, and then be recovered with an iron coating as often as may be required; and if care is taken to remove the coating of iron before it has been entirely worn away, the engraved copper or other plate may be made to print a vast number of impressions and yet remain in the original state it was in when it left the hands of the engraver, or was otherwise first produced; the only limit appears to be in the gradual change which takes place in the body of the printing surface by the compression to which it is subjected in the process of printing. Heretofore, in respect to plates engraved in intaglio, if of steel, they each yield on the average about 3,000 impressions without retouching; if of copper they each yield on an average not more than 800 without retouching; whilst electro casts of copper obtained from the originals will not on an average each yield even 200 impressions without retouching; in fact, such printing surfaces are so easily worn, that after the first 100 or 150 impressions there is a considerable deterioration in the quality of the work produced. Therefore, for the supply of the number of impressions often required by art associations and others, it has been found necessary to multiply the electro casts very con-

siderably. In such cases the invention is applicable with considerable advantage, for I find that an electro plate 40×22 inches covered or coated with iron has yielded 2,000 impressions without its being necessary to remove and renew the iron coating, there being no perceptible difference between the first and last impression, the work on the plate appearing not to have suffered in the slightest degree. Hence in future, by the application of the invention, it will only be necessary to multiply electro casts to such an extent as may be necessary to ensure the production of prints or impressions with the requisite speed on paper, calico, or other fabrics. At the same time an original engraving on copper would become, when treated according to the invention, more lasting than if engraved on steel. Although original surfaces engraved in relief, and also electro and other casts taken from them, yield a considerably greater number of impressions than those I have mentioned as obtained from plates engraved in intaglio, to which the invention has not been applied, nevertheless the invention is applicable with great advantage to such relief printing surfaces, whether of copper or other soft metal, for if they be coated with iron, according to the invention, they will yield almost an indefinite number of impressions, provided the iron surface be renewed as often as may be necessary, and the printing surfaces be again re-coated.

"In carrying out the invention, I prefer to use that modification of Grove's battery known as Bunsen's, and I do so because it is desirable to have what is called an intensity arrangement. The trough I use for containing the solution of iron in which the engraved printing surface is to be immersed in order to be coated is lined with gutta percha, and it is 45 inches long, 22 inches wide, and 32 inches deep. In proceeding to prepare for work, the trough, whether of the size above mentioned or otherwise, is filled with water in combination with hydrochlorate of ammonia (sal ammoniac) in the proportion of one thousand pounds by weight of water to one hundred pounds of hydrochlorate of ammonia. A plate of sheet iron, nearly as long and as deep as the trough, is attached to the positive pole of the battery, and immersed in the solution. Another plate of sheet iron, about half the size of the other, is attached to the negative pole of the battery, and immersed in the solution; and, when the solution has arrived at the proper condition, which will require several days, the plate of iron attached to the negative pole is removed, and the printing surface to be coated is attached to such pole, and then immersed in the bath till the required coating of iron is obtained thereto. If, on immersing the copper plate in the solution, it be not immediately coated with a bright coating of iron all over, the bath is not in a proper condition, and the copper plate is to be removed, and the iron plate attached and returned into the solution. The time occupied in obtaining a proper coating of iron to a printing surface varies from a variety of causes, but a workman, after some experience and by careful attention, will readily know when to remove the plate from the solution; and it is desirable to state that a copper plate should not be allowed to remain in the bath and attached to the negative pole of the battery after the bright coating of iron begins to show a blackish appearance at the edges. Immediately on taking a copper plate from the bath, great care is to be observed in washing off the solution from all parts, and this I believe may be most conveniently done by causing jets of water forcibly to strike against all parts of the surface. The plate is then dried, and washed with spirits of turpentine, when it is ready for being printed from in the ordinary manner.

"If an engraved copper plate be prepared by this process, instead of a comparatively limited number of impressions being obtained and the plate wearing out gradually, a very large number can be printed off without any sign of wear in the plate, the iron coating protecting it effectually; the operation of coating can be repeated as many times as required, so that an almost unlimited number of impressions can be obtained from one plate, and that a copper one.

"This process will be found extremely valuable for electrotype plates, and also for photogalvanic plates, since they can be so protected as to acquire the durability of steel, and more so, for a steel plate will require repairing from time to time, these will not, but simply re-coating whenever it is found necessary; by these means one electro copper plate has yielded more than 12,000 impressions, and was found quite unimpaired when examined minutely.

"It is easy to appreciate the importance of this invention, as applied to artistic or line engraving more especially, for a copper plate, being once engraved, if submitted to the acierage process, will become a lasting property, not liable to deterioration by printing, and the public may expect to be supplied with the very best impressions at a more moderate charge, whilst to the numerous branches of commercial engraving, for the ceramic manufactures and others, as well as to the vast number of old engraved copper plates existing in this country, this process is likely to confer an immense additional value.

"I need not say that copper is by no means the only metal to which the process is applicable, for the same principle will be found to answer in the case of other soft metals used for printing purposes; and I shall only add, in conclusion, that although the principle of electrotyping has been applied up to the present date in a variety of ways, since it was organised by Thomas Spencer, in 1837, this is, I believe, the first time that an attempt has been successfully made to prepare an engraved copper plate with harder metal, with the view of increasing its printing capabilities, and I feel happy to have been the first to introduce so valuable a discovery into this, my adopted country."

DISCUSSION.

Mr. GEORGE GODWIN, F.R.S., had listened with great pleasure to Mr. Joubert's paper, as, no doubt, all present had done. Passing to the more practical points of the paper, he would remark, in the first place, that he thought it ought not to be inferred that steel was only used in the present day for small plates. He believed it was also extensively used for large engravings, although the engraver would probably be glad to get rid of this metal, and return to the use of the softer material, copper, if a sufficiently large number of impressions could be taken from it, and this was the great point to be considered in estimating the value of the invention before them. He did not think Mr. Joubert was quite right in attributing the failure of the electrotype process to the softness of the electrotype plates. It was stated by Mr. M'Queen, in his evidence before a Committee of the House of Commons, that the electrotype plates gave as many impressions as the original copper plate itself. The Council of the Art Union of London had adopted the electrotype process at a very early period of its introduction, and, in some cases, with perfect success. For instance, in the case of the plate of "Raphael and the Fornarina," engraved by Lumb Stocks, there were fourteen electrotype plates taken from it, which produced 14,000 successful impressions. He believed 1,100 impressions was the maximum taken from any one of these electrotype plates, which was a very large number; it was true that some touching of the plates was required. He believed that was as large a number as could be taken from the original plate. The point he wished more particularly to dwell upon was this, that the softness of the plate was not the cause of failure, but, in producing the original, there was frequently a considerable amount of under-cutting, where the line was wider at the bottom than at the top, so that, when the matrix was removed from the plate, there was a certain amount of tearing off from the surface, and he believed it was that circumstance chiefly which had led to the idea that the electrotype process was a failure. They would see that, inasmuch as Mr. Joubert's process started with the use of electrotype plates, it was necessary that the inconvenience in that process which he had pointed out should be understood, in order that it might be guarded against. He feared, looking to the process exhibited that evening, that if the plates were suffered to remain too long in the bath there was danger of the finer lines of the plate becoming partially filled up. He thought a good test would be to take an impression from a plate just out of the hands of the engraver, and before being coated by this process, and also an impression from it after having been coated with iron.

Mr. JOUBERT remarked that he had been misunderstood if, as stated by the last speaker, he had represented that his process was more particularly intended to be applied to the electrotype plate on account of its softness. It was equally suitable for the original plate; and, as an example, he might state that the original plate of the engraving behind him (The Playground) had been coated by this process six months ago, and from it he believed 5,000 impressions could now be taken without its being necessary to renew the coating. With regard to the remark that the electrotype plates would yield as many impressions as the original plate, he begged to say that he had with him two impressions of an engraving which went to prove that this was

not the case. Referring again to the engraving exhibited, which belonged to the Art-Union of Glasgow, the impression they saw was the artist's proof from the original plate just after the engraving was completed, and here [producing another copy] was an impression taken from the electrotype plate coated by his process. The impression he exhibited was taken when there had been 2,300 printed off, and, when examined, he did not think that any real difference would be perceived between that impression and the artist's proof. Here [producing another copy of the same engraving] was a bad impression from the electrotype plate not coated, which began to fail after 240 impressions, and completely failed after 400. It was true that electro deposits were better than others, but he believed that, on the average, the number at which the electrotype plates began to fail was from 250 to 300, whilst from the original plate of beaten copper as many as 800 impressions might be taken without "touching."

Mr. Godwin said he had merely stated the fact as it occurred; that, in the case of the plate he had referred to, 1,100 copies were taken from the electrotype plate. It was true that frequent "touching" was found necessary.

Mr. Joubert believed his professional brethren present would bear him out that if, in the instance alluded to, as many impressions were taken from the electrotype plates as from the original plate, it was a very remarkable case. He had known so many "touchings" to be given to a plate that scarcely a particle of the original work remained.

Mr. M'Queen could confirm the statement of Mr. Godwin with regard to the engraving alluded to, namely, that the electrotypes yielded as many impressions as the original plate.

Mr. Joubert added that Mr. Godwin was quite correct in stating that one of the chief drawbacks of the process of electrotyping was when under-cutting occurred in the original plate; but when a plate was engraved with a view of being electrotyped, it was easy for the engraver to avoid under cutting and to secure a good matrix being taken from the plate without tearing off any of the lines.

Mr. Varley expressed a high opinion of the value of this invention.

Mr. Joubert said, that Mr. Godwin seemed to fear that there was danger of the fine lines of an engraving being filled up by the process of metallic coating. By way of experiment, he had tried to deposit a very thick layer of metal upon a plate, without regard to the filling-up of the lines, and he found that it was hardly possible to fill them up.

The Rev. Walter Mitchell begged to inquire how far this invention had been tried commercially, and with what results?

Mr. Joubert admitted the importance of the question just put to him, to which he thought he could not give a better answer than was afforded by a letter which he received two days ago from Mr. Henry Bohn, the well-known publisher, of York-street. Mr. Joubert then quoted from the letter, which stated that no one was more alive than the writer to the value of this discovery. Although he had urged on experimentalists to find out some means of hardening copper-plates, he had never anticipated such success as had been achieved by this process. He had had several of his old copper-plates coated, and was gratified to find that the operation had been entirely successful, reproducing the engraving without any loss of the original delicacy, and yielding a large number of impressions. He (Mr. Bohn) was now testing it upon plates which, but for this process, would be worthless.

Mr. J. Jenkins inquired whether this process had been as yet applied to the engraved plates for porcelain.

Mr. Joubert replied that at the present moment it was being applied with success by one of the largest firms in Staffordshire. He had coated one plate about six weeks ago, and he had received an intimation that the experiment had been so far successful that another plate would be sent to undergo the same process previous to its being printed from.

Mr. Jenkins added that his reason for asking the question was because some years ago it was considered desirable by the pottery manufacturers to supersede the necessity of having a large number of copper plates engraved with the same design. At that time he suggested the use of steel plates instead of copper; but it was found that they were obliged to cut the lines so deep, in order to hold the large amount of colouring matter necessary, that there was great difficulty in using this hard metal. A further objection to the use of steel plates in that class of manufacture was that the smoothness of the surface prevented them from holding the oily description of colouring matter used. In the ordinary mode of printing, the cleaning of the surface of the plate was performed by the hand, but in pottery work the plate was scraped with a spatula, and by that process the oily ink was apt to be dragged out of the lines. He thought the objection he had alluded to might be obviated by merely coating the surface of the plate with steel, not penetrating to the incised parts of the plate. The incisions would then remain copper, which would retain the coloured printing material, whilst the portion exposed to the friction of cleaning would be coated with steel.

Mr. Joubert said the objection to coating the surface of the plate would be that the spatula would just catch the engraved lines, which, not being protected, would become worn. This was one of the objects of coating not only the surface of the plate, but the incised parts also. The same remark applied to ordinary copper-plate printing, as well as to the class of work alluded to by Mr. Jenkins.

Mr. Blackwood inquired whether the process had been applied to ordinary printing types and stereotype plates?

Mr. Joubert replied that several plans had been tried for coating types with other metals—such as copper; but as it was known that ordinary printing type would endure a very large amount of wear, it was thought that there was no absolute necessity for applying this process. Stereotype plates also yielded a large number of impressions, and if they became worn out another set of plates could be made at a small expense. The process, however, was capable of application to type-metal, as to any other description of metal.

Mr. Le Keux was aware that for pottery work there was some difficulty in using steel plates. In a mercantile point of view, therefore, he had no doubt that this process could be brought into extensive use, not only in the potteries, but also in Manchester, where copper printing cylinders were so much used; but he thought in the higher branches of engraving, except in the illustration of historical works, although artists would lose nothing by this invention, they would be slow to adopt it until it had been put to some more severe tests than he had heard of. The experiments, as far as they had at present been carried, appeared to have been made with old plates, which had, as it were, been re-surfaced. With reference to the remarks of Mr. Godwin, relative to the failure of electrotype plates owing to the under-cutting, he begged to say that this was a mistake. Many engravers present would bear him out that the beauty of a finished plate, the tone, the air, and the finish, was got by the burnisher, and the under-cutting alluded to was not produced by the graver, but by the action of the burnisher.

Mr. Godwin said he simply stated that the under-cutting existed, which had the effect upon the electrotype plates that he had mentioned.

Mr. Le Keux continued:—This process was an addition to the surface as well as to the lines of the plate, and he repeated that he was anxious to see it put to a severe test. For mercantile purposes probably 99 persons out of 100 would not know the difference between an impression from the original plate and one from the coated plate; but he wished to see the experiment tried with a plate of high character, and that the results should be submitted to really competent judges. If this test then showed that the process neither robbed the whites nor the blacks, nor filled up the interstices, it might be considered satisfactory. He had not heard that the experiment had been tried to any extent with high-class plates. It might be that persons hesitated to expose plates of such high value to the risk of coating, but he could easily understand that those who had a stock of old plates on hand, from which scarcely a hundred impressions could be taken, would be very glad to subject them to a process which would enable them to print off thousands.

Mr. Joubert said he was most anxious to have the opportunity of testing his process upon a plate fresh from the hands of the engraver. As yet he had not tried the experiment upon fresh plates, except upon some of his own, which had been engraved about 12 years ago, and from which only a few impressions had been taken. In the case of these experiments, he, in the first instance, took an impression from the original plates, after which he submitted them to the process of coating, and took another impression. These two impressions were afterwards shown to his friend the chairman, who would, no

doubt, kindly state what had occurred with reference to them.

The Chairman said, this being a very important question as far as Mr. Joubert was concerned, he might be permitted to say that the proof which he had selected as being the impression from the original plate, and which he judged to be the best, turned out to have been taken from the coated plate, so that, if there was any difference at all, the palm of excellence was, in that instance, on the side of the latter.

Mr. William Humphreys remarked, that a previous speaker had referred to the facility with which colouring matter was removed from the plates used in printing for pottery purposes. In ordinary copper-plate printing, a very viscid quality of ink was used, and he recollected the difficulties experienced in the early stages of steel-plate printing on that account, but, by the adoption of a suitable ink, the one description of plate was now worked as easily as the other. The great advantage of Mr. Joubert's process he conceived to be this—that, the plate having a steel surface, the ink could be wiped from it previous to printing, with a less amount of friction than was the case with copper-plate, which held the ink more tenaciously, whilst undoubtedly a greater number of impressions could be obtained from a plate treated by this process.

Mr. Winkworth would be glad to have the further confirmation of so high an authority as that of the chairman upon the point mentioned by Mr. Joubert, viz., that the impression taken from the coated plate was, in all respects, equal to that taken from the original plate.

The Chairman said he could easily satisfy Mr. Winkworth upon that point. He understood the capabilities of Mr. Joubert's invention to be this—that an impression might be taken from a copper plate in whatever condition it might be, whether direct from the hands of the engraver, or after a number of impressions had been taken; it might then be coated with the steel and another impression might be taken, and he understood Mr. Joubert to state that the impression would be identically the same in appearance. As to this being the fact, he could only repeat what he had already stated, viz., that in two specimens that were submitted to him, he selected as the better impression of the two that which had been taken from the steel-coated plate. It undoubtedly was the better of the two, although this might have arisen from some accidental circumstance.

Mr. Yates suggested that a satisfactory test could be afforded by printing with a portion of the plate uncoated. It would then be seen on which side the advantage lay.

Mr. Joubert said that experiment was about to be tried in the course of a few days by Mr. Virtue.

Mr. Winkworth had been requested to ask one other question, viz., whether the recently-published engraving of the execution of Lady Jane Grey, after Paul Delaroche, had been worked from a plate which had been subjected to Mr. Joubert's process, and whether the greater number of impressions had not been printed from the coated plate.

Mr. Joubert replied that the engraving alluded to had been a considerable number of years in hand. It was the work of an Italian artist, who began it 25 years ago, and though not constantly engaged upon it, worked at it for many years. The result was, that when the plate was finished, owing to the long time occupied upon it, either from the friction of the sleeve or the hand of the artist, the plate was very much worn, and a well-known printer in Paris, to whom the execution of the work was entrusted by the publisher who had purchased the plate, made the startling announcement that he could not produce more than 75 or 80 impressions from it. That was a most serious matter with regard to an engraving that had cost between £3,000 and £4,000, as the publisher could put no price upon the impressions to repay him for his outlay. The consequence was that the plate was electrotyped. Four plates were successfully taken, and from those the publisher intended to print the limited number of 300 copies, upon which a price would be put to repay him for the cost of the engraving. Having, however, heard of this process, he called upon M. Garnier, the inventor, and asked him to undertake an experiment with his plate. At that time the process had not been tried upon any plate of consequence, and M. Garnier felt a little nervous about it. He was, however, prevailed upon to try it upon the four electrotypes. Impressions were taken before and after the coating, which were submitted to the principal engravers in Paris, who pronounced the experiment entirely successful—they, in fact, said they could detect no difference between the two.

The Chairman said it was now his agreeable duty to propose a vote of thanks to Mr. Joubert for the paper he had read, and he thought the frank, truthful, and, he might add, understating spirit which had characterised all that he had said, entitled him to their respect as well as to their thanks. With regard to this, he must call it, important process, he thought it might be considered one of the great discoveries of the age. Very analogous to this was the discovery made a few years ago, also in Paris, of a material for indurating stone, which had since been extensively carried out; and he believed that architects might now defy the efforts of the elements and of time upon their structures. With regard to Mr. Joubert's process, the point which had principally occupied their attention was its capability of producing impressions from the coated plates equal to those from the uncoated plates, and on this he (the Chairman) had given his opinion. The other important point was, the durability which it imparted to the plates, and the quality it gave of multiplying copies to a considerable extent. But the pretensions of the discovery were yet greater; in fact, he saw no limit whatever to the working of plates when subject to this process. As soon as one coating exhibited symptoms of wear, it could be removed, and another coating put on; and, inasmuch as the printer could detect the slightest tendency to failure, the work could be stopped at any time, and thus the plate would be kept in a condition to produce impressions equal to proofs throughout the entire publication. If he was correct in what he had stated—and, so far as his knowledge enabled him to judge, he was so—he was sure he need only to invite them to accord their thanks to Mr. Joubert, for having brought before them so important and so valuable an addition to the scientific discoveries of the present age.

A vote of thanks was passed to Mr. Joubert.

Photographic Chemistry.

AIR AND WATER.

Air and water are two compounds of such importance in chemistry, that we consider it necessary to devote some columns to a consideration of their qualities. In the opinion of the ancients, air, water, earth, and fire were the elements of all bodies of whatever nature they might be: we now know air to be a mixture of two gases, nitrogen and oxygen; and water to be a combination, in equivalent proportions, of hydrogen and oxygen.

Air.—The composition of atmospheric air has been perfectly known a very long time: we have already stated that it is composed of nitrogen and oxygen, and the proportions in which these two gases unite to form air is, as nearly as possible, four of the former to one of the latter. The manner in which this may be ascertained is, by boiling mercury in a closed vessel for a considerable period, when it will absorb the oxygen, and become converted into a red, scaly oxide. The quantity of air which remains in the vessel being ascertained, and the oxide of mercury being heated until restored to its original condition, the amount of oxygen given off will be found to be one fourth of that contained in the first vessel.

Besides oxygen and nitrogen, air always contains a small quantity of carbonic acid, the product of combustion and respiration, as well as vapour of water, arising from the continual evaporation of the water spread over the surface of the globe; the quantity of this vapour differing, of course, according to the nature of the locality, the direction of the winds, the season, and the temperature of the atmosphere: it is owing to this facility which air possesses of charging itself with vapour, that the wet papers give off their moisture in dry air; and this vapour, when the air is very humid, becoming condensed on the object glass, may obscure the image in the camera.

The quantity of oxygen contained in the air determines the rapidity of combustion, which may be either slow or active, according to the nature of the combustible. In the

case of iron, for example, the metal can only be melted by an intense furnace heat; but if an iron wire, to one end of which a bit of burning candle-wick is attached, be introduced in a glass jar of oxygen, the iron will be seen to burn like a thread of flax.

Water.—There are bodies which are termed *combustibles*, and others which are termed *supporters of combustion;* for example, water, which is the body we have next to examine, is a compound of a combustible and an incombustible body, viz., oxygen and hydrogen. The former gas, as we have already pointed out, increases the intensity of combustion to its highest point, yet it cannot itself be made to burn; whereas the latter gas, hydrogen, so far from supporting combustion, would immediately extinguish a lighted taper immersed in it, and yet is susceptible of ignition, and burns with the emission of intense heat though little brilliancy. It may appear surprising that the body to which we resort to extinguish fire should be composed of two substances, the one exceedingly inflammable, and the other such an active supporter of combustion; yet that this is so can be easily demonstrated by various experiments, such, for instance, as the passing of steam through a gun-barrel containing pieces of iron, the whole of which is maintained at a red heat, and the gas passing through received in a bladder at the opposite end. It will be found at the termination of the experiment that the pieces of iron are converted into an oxide, and the gas in the bladder to be far lighter than the same bulk of common air, and to possess the qualities we have indicated as belonging to hydrogen, which in fact it is. There is a much more simple and easy way of testing the composition of water than the above, which consists simply in plunging into a vessel containing water the two conducting wires of a voltaic pile, and inverting over the poles two bell glasses full of water. If a somewhat intense electric current be now passed through the water it will be decomposed, the oxygen flying off from the negative pole, and the hydrogen from the positive pole.

(To be continued.)

Dictionary of Photography.

ACTINOMETER *(continued.)*—Mr. Hunt afterwards constructed an instrument on the same principles as those mentioned above; it was used for some considerable time, but it was placed at the Kew observatory and lay there neglected. The same gentleman has since constructed another instrument of which, as it seems to possess several good points for an instrument of this kind, we give the following description in his own words, he having read a description of it, some time ago, before a scientific society, which was afterwards published in their *Transactions*:—

"This actinograph consists of two brass cylinders moving freely upon their axes, one of them containing a powerful clock-spring, by which the apparatus is driven. These cylinders are fixed about twelve inches apart, and around them is placed a band of indian-rubber cloth, which being carried round by the friction against the upper working barrel, makes a complete revolution in twenty-four hours. The uniform rate of motion is secured by an ordinary clock escapement and pendulum. This apparatus is adjusted at such an angle that the direct radiations from a zone of the heavens, about 45° above the visible horizon, may fall upon its upper surface. This clock-work is, therefore, inclosed in a box, and covered with a brass plate, in which there is a triangular opening. The widest part of this opening measures one inch, and the smallest the sixtieth part of an inch. This is divided, 1st, into five holes of such sizes relatively as represent the periods of 1, 2, 3, 4, and 5 minutes; and 2ndly, by bars, the openings between each being adjusted to regularly increasing divisions, from 10 to 60. From this it will be understood that any point of the moving band will be exposed to the daylight for an hour in passing under the largest opening, and the time of exposure diminished by ten minutes in each of the other divisions until the smaller ones. In these the times of exposure are, under the largest hole five minutes, and under the smallest one minute.

"If we attach to the moving web a piece of prepared photographic paper, it will be evident that for the whole of daylight it will be receiving impressions during the time of exposure above described. The line which passes under the smallest hole will never be exposed for more than a minute, while that which moves under the largest opening will never be exposed for less than an hour; consequently we have the difference between 1 and 60. Now the maximum effect will be the blackening of the paper thoroughly in one minute, when of course the image of the opening and its divisions will be deeply impressed: the minimum effect will be, that the exposure of an hour is necessary to produce any sensible change in the colour of the paper; then we shall have the line under the longest opening alone well defined, the others becoming less and less distinct, until the paper remains absolutely white over those parts which correspond with the diminished openings. It is my intention to fix a numerical value to each of these, which will enable me to tabulate my results, and register the relative value of the actinic radiations by the side of the indications of the barometer, thermometer, and hygrometer. I wish to these the photometer could be added, but at present we possess no self-registering instrument which will give us indications of the variations in solar light. . . . .

"In the use of this instrument I prefer presenting it to the light of the northern sky rather than to the direct rays of the sun. In the latter case every passing cloud which obscured the face of the sun would be registered, but I believe the most accurate registration of the quantity of the chemical radiations active during daylight, will be more correctly determined by obtaining constant comparative results from the same point of the northern sky. The material with which I prepare my paper is a standard solution of the oxide of silver in ammonia. One wash only is applied to the paper, which is then found to be sufficiently sensitive for all the purposes of the instrument.

"A solution of that kind, kept in my bottle, remains constant for any length of time. After one single wash of this, the paper is placed damp in the instrument, and exposed during the hours of night; it dries, and in the morning it is in a uniform condition, which will last during the day."

(To be continued.)

A Catechism of Photography.

WAXED PAPER PROCESS—*(continued.)*

Q. What is the best method of preparing the paper for the waxed paper process?

A. The best, simplest, and most rapid process of waxing the paper is as follows:—Procure an iron plate, about a quarter of an inch in thickness, and a little larger than the paper to be used; place this plate over a furnace heated with charcoal, and keep it at a regular temperature; upon this plate then place one or two sheets of clean paper, on which arrange your paper for waxing.

Q. What sort of wax should be employed?

A. Either white or yellow wax will answer; but white, being the purest, is generally used in preference to yellow.

Q. How is the wax to be applied to the paper?

A. A piece of fine white wax is passed to and fro upon it until the surface of the paper is completely impregnated. Another sheet of paper is then laid on and waxed in a similar manner; a third and a fourth, even up to ten, may be added. They must then be separated, and each piece be placed between folds of blotting paper, and an ordinary iron, moderately hot, be passed over them.

Q. Wherein does the necessity exist for the further application?

A. The waxed paper being placed between blotting paper, the additional heat is applied for the purpose of removing any excess of wax which it may have taken, and which is, by this means, absorbed by the blotting paper.

Q. What is the advantage obtained by this waxing process?

A. The chief advantage of the wax in this operation is, not solely that it gives greater force to the picture than by the ordinary process, but that it gives additional transparency to the paper, and by impregnating its texture renders the subsequent operations far more complete than would otherwise be the case, and consequently makes the paper retain its sensitive properties for a considerable period.

Q. The paper having been waxed, what is the next operation?

A. A solution is prepared in the following proportions:—Sugar of milk, 620 grains; iodide of potassium, 225 grains; cyanide of potassium, 12 grains; fluoride of potassium, 7 grains, in about a pint and a half of rice water. The cyanide and fluoride of potassium may be substituted by about 45 grains of bromide of potassium.

Q. Will this solution keep for any length of time?

A. It will keep perfectly good for a considerable time.

Q. How is the solution applied to the waxed paper?

A. Some of the solution is poured into a bath or earthenware dish, and the waxed paper is plunged into it sheet by sheet, one over the other, great care being taken to remove any air bubbles which may arise. The sheets may remain in the bath from half an hour to two hours, until they have thoroughly absorbed the solution. The whole mass should then be turned over, and the first sheet removed and hung up to dry. It may easily be attached to a line by means of a pin at one corner; the drop on the lower angle should be removed by touching it with blotting paper.

Q. What is the next operation?

A. The paper, prepared as already stated, may either be employed at once or preserved for future use.

Q. Is it, then, in this state, ready for the camera?

A. No, it has to pass through a third process before it is capable of receiving a photographic impression.

Q. What is the third process?

A. A solution has to be prepared as follows:—Distilled water, 1 pint; crystallised nitrate of silver, 665 grains; crystallised acetic acid, 760 grains.

Q. How is this solution applied to the paper?

A. Three baths of glass or earthenware should be placed near each other. Great care must be taken that these vessels are chemically clean. A portion of the last solution must be filtered into one of these baths; in the other two should be pure distilled water. A packet of thick blotting paper is also required. These preparations being made, take a number of sheets of the waxed paper, and proceed thus:—Take the first sheet, and carefully place it upon the aceto-nitrate bath, taking great care that no air bubbles interpose. Allow it to remain in contact with the fluid until chemical combination is effected.

Q. What is the general time taken to effect this combination?

A. Eight or ten seconds are sufficient for some kinds of paper, and four or five minutes are required for others. When a violet tint appears the paper should be removed. It must be immediately removed; immersed in the distilled water (No. 1); thoroughly washed, and then removed to distilled water (No. 2); after which it should be dried, or partially dried, by the blotting paper.

Q. Must the sensitive paper be used immediately?

A. When it is desired to keep the paper for some time before using, it is recommended that the application of the nitrate of silver be less than on other occasions. It will thus be seen, that the papers which are prepared for keeping are not those which are the most sensitive; hence it is necessary to expose them for a much longer period to the action of the light than those prepared by a stronger solution of silver.

Q. How is the image taken in the camera developed?

A. By a solution of gallic acid in distilled water, in the following proportions:—Gallic acid, 6 grains; distilled water, 4 ounces; and a few drops of the silver bath. The paper should be immersed in this solution, and allowed to remain in it until the picture is fully developed.

(To be continued.)

Correspondence.

THE COUNCIL OF THE PHOTOGRAPHIC SOCIETY AND THE "PHOTOGRAPHIC NEWS."

OUR thanks are due to the following gentlemen who have so promptly and decidedly favoured us with their opinions on the above point:—C. E. D.—A MEMBER.—J. S.—G. W.—W. L.—J. B. D.—C. O. R.—M. P.—A. B.—A PHOTOGRAPHER WHO SEEKS THE EXTENSION OF HIS ART.—G. S.—CARBON.—AN *Ex.*-MEMBER OF THE COUNCIL.—AN OLD-WOMAN HATER.—RIGHT IS MIGHT. Although our thanks are due to all, we have only been able to select the two following letters, which embody the opinions of the remainder. Our space would be insufficient for the insertion of all; and indeed, whilst we are grateful for the writers' sympathy, some of them advocate opinions too extreme for us to feel justified in giving them the publicity of our columns. We have many warm friends on the Council, and we are sure that they will not be slow to see the ridiculous position in which this obnoxious resolution has placed the Society. That it has been concocted by a small minority is our firm opinion, and we would leave it to the good sense of the whole body to rectify a blunder which is equivalent to an attack upon the privileges of the entire press of England.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—As I rarely open my copy of the publication to which my subscription entitles me, unless when it contains a report of a meeting, I should have remained in ignorance of the "resolution" adopted by our Council had not my attention been called to it by the article in the "PHOTOGRAPHIC NEWS." My first feeling, I confess, was one of incredulity; I found it difficult even to imagine that our Council could have committed such a blunder, not to give it a worse name. If their object was to bolster up the circulation of the Society's organ, they could not have adopted a worse plan for furthering that object; since a comparison with the "PHOTOGRAPHIC NEWS" would inevitably lead to a discontinuance of the subscription to the journal unless the subscriber were, to a certain extent, interested in its maintenance; and, as you may fairly enough inquire, if that was not their object—what was?

I have read the article containing the resolution over and over again. I have pondered over it, with the view of ascertaining its meaning, as deeply as if it were one of Mr. Shadbolt's speeches, and I were bound, as a punishment for my transgressions, to find out the meaning for it; and I am forced to acknowledge—though I confess I do so with reluctance—that I can find no other explanation of the motives of the Council than that which you have suggested, viz., "a desire to impede the increasing circulation of the 'PHOTOGRAPHIC NEWS.'" Having assisted in electing the Council, I would willingly disbelieve that its members could have been actuated by any such paltry motive; but the complete manner in which you have demolished the reasons alleged by the Council, leaves me no alternative than to admit that the men whom I supposed incapable of being influenced by any except the most honourable motives, have descended to a species of petty warfare which, if carried any further, must inevitably lead to the dissolution of the Photographic Society, as at present constituted. For my own part, I will never consent to any interference with the utmost liberty of the press; and if the "PHOTOGRAPHIC NEWS" sees fit to publish any remarks I may offer at any of our meetings, I shall esteem it an honour; and in the event of my having occasion to read a paper, I will freely place a copy of it at your service; and that which I am prepared to do, I have no doubt every one of my fellow-members, with, perhaps, one or two exceptions, are prepared to do likewise. The welfare of the

Society is, of course, dear to me; but if it is to act as a bushel to diminish our individual light, then—why, then the sooner it is itself extinguished the better. Those among us who may happen to be gifted with a fair proportion of brains, cannot afford to have their labours confined to the knowledge of a "select few." What we want is the greatest publicity, and it signifies little to us how this publicity is obtained, provided it *is* obtained. I entirely agree with you that a man is not fairly rewarded for months or years of labour if the result of his labours is to be "entombed" in the columns of the Council's organ alone, especially now that it is so difficult to find materials in the practice of photography of sufficient interest to form the subject of a paper worthy of being read at our meetings; and members who are fortunate enough to make any remarks that are thought of sufficient importance to be published in the "PHOTOGRAPHIC NEWS" can only feel one sentiment on reading them therein—that of gratification. I presume that if you happen to commit any error in your report of them, either of us would be only too happy to have an opportunity of seeing his name appended to a letter in the photographic publication which is honoured with the correspondence of such eminent men as Sir J. Herschel, Mr. Fox Talbot, and others.

You observe in your article, that you "regret that the names of the members of the Council, whose united wisdom led them to the enunciation of the above dignified resolution, are not appended to it." I share that regret with you. I cannot help doubting whether there could have been even a sufficient number of the Council present to form a quorum, though only five members are necessary for that purpose; and for the sake of the reputation of those members of the Council in whom I am more particularly interested, I should have been glad to have been assured that they were not of the five. I am thoroughly and entirely convinced that if even half of the members of the Council had been present when the resolution was mooted, nothing would ever have been heard of it, except from the conversation of those of our body who are more than usually well-informed of the subjects of debate at the meetings of the Council.

I am sure that my fellow-members of the Society will agree with me that the proceedings of the Council in this matter have been uncalled for, and unworthy of the Society. In a matter of such importance, affecting, as it does, its character, I conceive that the resolution ought first to have been submitted to the Society at one of its meetings. What will the public think of such an attempt to suppress reports of the proceedings of a public body? The Council may argue that they had no intention of suppressing reports of the proceedings, but their resolution amounts to this, since it expresses a determination to allow no other publicity than such as it chooses to sanction, which is almost as unsatisfactory as if they prohibited their publication altogether.

I again assert my conviction, that if the Council in a body, including its President, had been present when the "Resolution" was proposed, the public would have heard nothing of it; and I trust that if an opportunity arises for the discussion of the matter at our next meeting, the members of the Society will not be backward in expressing their decided disapproval of the Council's proceedings in this matter.

I inclose my card for your private satisfaction, but I do not wish you to append my name to this letter unless you see an urgent reason for so doing. At the same time I shall not hesitate to avow and maintain my opinion at a suitable time and place, if any opportunity occurs for so doing. In the meantime, I subscribe myself simply as

AN *Ex*-MEMBER OF THE COUNCIL.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—Having read your leading article last week, as well as that which called it forth, in the Journal of the London Photographic Society, I cannot avoid putting to myself the question, am I in England, in a country glorying in a free press and liberal institutions,—in a land remarkable for its scientific discoveries, its literary attainments, and, more than all, for the publicity of all its great social as well as political movements? The resolution passed by the Council of the Photographic Society is so utterly un-English, so completely repugnant to all our habits and sympathies, and approaches so much more closely to the measures adopted on the other side of the channel, that I am more than half inclined to believe that the Council in question is but the London representation of some great parent *Société Photographique* in Paris, with Louis Napoleon for its president.

I say that the "resolution" is not only un-English in its general scope and bearing, but that it is at open variance with the regulations of every scientific institution. The Society of Arts, the Geographical, Ethnological, Geological Societies, and all kindred associations, seek every opportunity of laying their discoveries before the world. They court publicity; they gladly avail themselves of every medium which offers this desirable end. It is left for the Council of the Photographic Society to introduce a new order of things; to make a new epoch in the history of scientific progress; to stand forth as the champions of exclusiveness; to claim their right to gag the free press of England, and to forbid the publication of any valuable discovery or important fact in photography, until they, the oracles, shall have secured it the minimum of publicity which their own petted journal affords. There is something exceedingly anomalous in all this. Here is a company of scientific men, claiming an indefeasible right to scientific discoveries. Here is a scientific Council ostensibly bent on the improvement and extension of our beloved art, yet unwilling that any improvement should be published, or any attempt made to extend a knowledge of the most recent discoveries. Here are photographers—which, if I know anything of the meaning of that term, is a name which signifies delineators by *light*—anxious that everybody should remain in the *dark*, unless they receive their modicum of light through the literary lantern of the London Photographic Society.* Of all men, photographers should love the *light*—light of all kinds, and not, with the narrow-minded sordidness of a trading clique, make, or *strive* to make, a market of their proceedings.

I say *strive* to make a market of their proceedings, for that any benefit can possibly result to themselves by such an effort is out of the question. The Council may endeavour to give an impetus to the circulation of their own obscure organ by an attempt to damage the sale of your widely-circulated journal; but the attempt must fail. Everybody knows something about the "PHOTOGRAPHIC NEWS;" but who—beyond their own immediate coterie—knows anything about the journal issued by the Photographic Council? I find your journal quoted everywhere; but I never find a paragraph of theirs creeping into any daily or weekly paper, however obscure. How is this? Just because your journal is what it professes to be—photographic *news;* and if the Council, or any of its members, doubt the immense circulation you have gained, let them inquire at any bookseller's or photographic depôt in town or country.

After such a "resolution" as that adopted by the Council, I, as a member of the Society, shall at once withdraw. That petty malice at the success of another journal should be allowed to interfere with the progress of science, is absolutely preposterous. Surely scientific men should hail every means of spreading a report of their investigations, and be the better pleased the more widely those reports are spread. One can scarcely credit the idea of a learned Council stooping to the paltry annoyances which a small-minded opposition trader might offer to a respectable neighbour. But the members of the Council have put the matter beyond a doubt by their late "resolution,"—a "resolution" which is calculated to diminish their Society by driving out all those who are really anxious for a wide-spread knowledge of photography. Who would not shrink from the invidious position of being

* *Lucus a non lucendo.*

connected with a Council so narrow-minded, so short-sighted, and guilty of such petty malice? Who that cares anything for the progress of scientific investigations, would not rejoice to avail himself of the medium offered by your excellent journal? Is it not obvious to the most ordinary capacity, that a real lover of science is anxious to spread a knowledge of that science? Is it not plain that no envious feeling at the marvellous success of a scientific journal would be excited in the breasts of those who were thoroughly devoted to the cause of science? And does it not appear, from the "resolution" of the Council, that they positively grudge the scientific public a knowledge of their investigations? The result is sure to be mischievous to themselves. In free England, tyranny of every kind is repugnant to us all. We cannot tolerate interference with the public rights, and the Council which would borrow a leaf from the *Code Napoleon*, and incorporate it with their philosophical transactions, is that sort of Council which is unfit for England, diametrically opposed to our national feelings, and utterly unworthy of us as a great people.

I do not despair, sir, of pursuing my photographic researches in defiance of the awful denunciation of the Council of the Photographic Society. I am confident that the Society has little or no sympathy with its Council. You number warmly attached friends amongst its members who are animated by a noble desire to send forth the result of their investigations to the world, and who are not to be awed into silent submission by any tyrannical resolutions. All the information that is of any importance or interest to photographers will certainly find its way to your journal, and while I can read the "PHOTOGRAPHIC NEWS" I shall rest satisfied that I know all that need be known about the progress of our valuable and interesting science. I would, however, offer a suggestion to the Council, which that august body is at liberty to take or leave as it pleases, namely, that a neighbouring country would be far more congenial to its spirit and sympathies, and that in the land where freedom of speech is denied, where the press is gagged, and where men may scarcely dare to *think* a free thought, it would find a state of things exactly in harmony with its own "resolutions."—I am, sir, your obedient servant,

A PHOTOGRAPHER WHO SEEKS THE EXTENSION OF HIS ART.

Monday, Nov. 29, 1858.

CARBON PRINTING.

SIR,—It was my intention to have troubled you with this last week, but afterwards I determined to wait and see if your No. 12 gave any further particulars connected with *printing in carbon*. You did certainly mention rather briefly the part your "enthusiastic contemporary" has played (to the no small amusement of his readers) in this matter, but I imagine that had you known the *whole secret* you would not have "drawn it so mild."

It is patent to the photographic world how the subscribers to the journal alluded to have since about last March been continually "worried" for subscriptions towards purchasing the *secret* of carbon printing, but all the "philanthropy, energy, and prophecies" of your contemporary failed to convince photographers of the importance of the process. Why? They had not forgotten how many silver baths, with lemon juice, &c., had been spoiled, how much paper wasted, and the amount of disappointment, not to say disgust, they had experienced through a certain *permanent* printing process so continually paraded in the columns of the before-mentioned journal. I remember laughing heartily at a letter in another of your contemporaries, some time since, by a gentleman who had been practising the "permanent process;" he succeeded in getting *one* tolerable print, but could not repeat his success. As a last resort, he wrote for a "specimen print," and to his great surprise and annoyance found it was no better than what he had considered failures. Now, this identical circumstance happened to a friend of mine. He practised the process, and obtained *once* the best print I ever saw, but could not do so a second time. He wrote for a specimen, and I imagine I now see how his countenance changed as he took it from the envelope.

Nor can it be wondered at that "doubt and mistrust" have been excited in the minds of photographers when the organ in question has been selected to bring the matter before them. In the sketch last week you omitted to state that in the early attempts to induce photographers to buy the "secret," it was held out that "if the subscriptions did not reach the desired amount (£100), we should have to wait patiently till the specification was published, and that then the patent would be binding on every honest man," evidently implying that the full particulars were contained therein: it was certainly not the work of men acting "truthfully and manfully," to be afterwards told by them, *the specification did not include the particulars of the process*, and in nearly the same breath to be informed *minutely* of a carbon process by Mr. Seely, of an American Photographic Journal, and admitted to be "pretty nearly the same as the secret process"—"that by it better pictures have been produced in America than those sent from here." Compare the candid admission of Mr. Seely that he subsequently found he had been "anticipated by M. Poitevin years before," with the "emphatic" statement of your contemporary, that the "secret process" is "different" in important particulars, and very superior to the patented process of M. T. de Beauregard, described in the published specification. But the worst remains to be told. You concluded last week's article by informing your readers the subscription list was again open; that £100 was the sum required, and that then the amount was nearly subscribed. Your contemporary, on the 15th inst., informed the subscribers "that on forwarding the sum they had promised the FULL particulars by which they could at once produce good pictures would be sent them, and information given which, if published, would be very important." Now, happening to be a subscriber (whose mind was not free from "doubt and mistrust," and who was induced to subscribe chiefly from your remarks on the specimens you inspected), I felt curious to "know the proportions of the ingredients, the mode of mixing and applying them to the paper," and also the "particular kind of paper which it is really necessary to employ;" and though almost prepared for anything, was rather crest-fallen, when expecting to receive a "Pamphlet," with full particulars, at finding that half a sheet of indifferent (letter-size) paper was sent, with extra wide margins, sufficed to contain all the "would-be patentee" has thought fit to divulge to his subscribers. It approximates most to the directions usually to be found on packets of patent starch, baking powder, &c. I may add, the proportions and mode of applying are rather *vague*, and scarcely different to Mr. Seely's, whilst the "vegetable carbon and particular kind of paper" are never alluded to; but a separate circular states they can be *purchased from the inventor*. Some friends here have been trying to produce pictures by following implicitly the directions given, but without success. I sincerely hope, for the sake of photography generally, there may be more virtue in the "prepared carbon and particular kind of paper" than we are at present aware of. I inclose a print produced last week by M. T. de Beauregard's process of applying the bichromate and gum arabic to the paper first. The carbon was prepared by collecting the flakes of the smoke from burning camphor. It was difficult to grind up with water, but easily so with alcohol. With these particulars, I leave your readers to form their own opinions as to the way the process has been managed and sold (it beats Rarey outright), and also as to the merits of the process itself, compared with others said to be so vastly inferior. Hoping subscribers generally have been more fortunate, I remain, yours, &c.,

Nov. 29, 1848. CARBON.

THE RASPBERRY SYRUP PROCESS.

DEAR SIR,—I have just received the "PHOTOGRAPHIC NEWS" of the 19th, and I hasten to say a few words about the letter in the *Times* of the 19th, written by Murray and

Heath. While I was in England, having occasion to call at Murray and Heath's, and other photographic houses, I mentioned to them, and also to several amateurs, the raspberry syrup process, which I had found and still find the simplest and surest process of any I have hitherto experimented with, but I had not the slightest idea that any one to whom I mentioned it would have made it thus public: and though I do not exactly blame Murray and Heath for having done this, they certainly have stolen a march upon me; for, on my return home, I set to work to write you a full account of the process, detailing the result of experiments on plates prepared seven weeks ago—sudden illness prevented my finishing it. The negatives taken on plates prepared this time are in every respect most successful; and as soon as I am able I will send you proofs of them. . . . .

You speak of the raspberry syrup being a remarkably indefinite compound; all I can say is, that whether fresh or old, whether purchased at one shop or another, it invariably answers the purpose required. The least amount of mucilaginous matter and malic acid in the raspberry renders the syrup a valuable preservative. In a few weeks time I shall have an opportunity of sending you a small quantity of the syrup purchased here, wherewith to experiment. The price of the article here is about tenpence a pound, a quantity which will last a very long time. Murray and Heath have omitted to say that it is necessary to use with the developer a few drops of nitrate of silver solution.

Yours very sincerely,

Lausanne en Suisse, Nov. 22nd. J. LAWSON SISSON.

GRAPH *v.* GRAM.

SIR,—You never can mean that it would be correct to alter litho*graph*, photo*graph*, stereo*graph*, into litho*gram*, photo*gram*, stereo*gram*, making them identical with epigram, monogram, anagram. At this "scientific" rate we should be invited to the *grammic* not the *graphic* conversazione, &c. &c.

If you had rapped with your ferule the unsuspecting pates of para*graph* and auto*graph*, it would have been more to the purpose.—Yours, &c., SOL HYPO.

[We are quite serious in maintaining that lithogram, photogram, and stereogram are etymologically correct when they signify the things indicated and not the indicators.]

Photographic Notes and Queries.

MR. M'CRAW'S PROCESS.

SIR,—I must apologise for delaying so long in complying with your request to send you further particulars regarding what has been called out of courtesy *my process*, but more of this anon.

I find that the chief difficulty with some of your correspondents, as well as some of my friends who have been trying this process, has been getting dirty negatives instead of tolerable positives. This may result from either of two causes, or from both—these are, over printing, but chiefly imperfect washing before immersion in the iron bath.

As the exact time for exposure to the light will be best ascertained by experiment, I would recommend that two or three pictures should be printed, giving them all different lengths of exposure, then let them all be washed and deepened together.

I think there is only another point that needs to be alluded to, and that is, to learn the effect of the last mixture of pyrogallic and acetic acids, and acetate of lead. If the prints look pretty well before immersion in the above, let them remain about half a minute; but should they appear dark and overdone, allow them to remain until they are clear enough, as this mixture has the effect of taking them down. Care must here be taken that the delicate half tints are not destroyed by a too prolonged immersion. If the pictures then look dirty in the whites, they have been insufficiently washed; but if the whites refuse at all to appear, then they have been much overprinted. Again, if the whites appear without sufficient middle tint, the fault is too short exposure to light.

So far as I am aware, we are indebted to M. Sella for the first idea of this process; but, I believe, Mr. Sharp claims it for his friend Mr. Perry. I have not been fortunate enough to fall in with any description by Mr. Perry of his process, so in the meantime I propose to call what I have done experiments with, or experiments on, M. Sella's process.

Before concluding, do you happen to know whether there are any patents in force affecting this process?

WILLIAM M'CRAW.

54, Frederick Street, Edinburgh.

ALABASTRINE PHOTOGRAPHS—CHROMO-PHOTOGRAPHS.

SIR,—Many of your readers have no doubt tried the Alabastrine Process, and after varnishing have hardly been satisfied with the result; to such the following remarks may not be unacceptable:—

1st. Let the redeveloping solution stay on an hour, instead of ten minutes.

2nd. Use a dilute varnish—equal parts of ordinary chloroform varnish, and chloroform, for instance: the motive of this is to give a gloss to the shadows, while the lights are pure and have not that disagreeable semitransparency which is the result of using a full bodied varnish. The picture can now very readily be coloured so as to be seen nonreversed by—first, tinting in the usual manner; and, secondly, pouring on and off ordinary turpentine, dry at the fire, deepen the tinting where required; this has so altered the appearance of the deposit, that the tinting shows nearly as plain through the glass as it does on the collodion side; back up with another glass, pour the black varnish on that, and the chromo-photograph, or whatever other name you may please to call it, is finished. W. G.

EXCHANGING PHOTOGRAPHS.

SIR,—Among the numerous readers of the "NEWS" there must be many who have been trying Fothergill's Dry Process during the past summer, and some with more success than others; of the successful few I have a favour to ask. Will any of them be kind enough to send me one or two of their *best* prints, either for inspection, and to be returned, or to be exchanged for an equal number of my own? If in exchange, stereograms preferred. I have been working this dry process with tolerable results, and should much like to see what success has attended the efforts of my brother amateurs.

Inclosed you have a couple of stereograms for yourself; —not *spoiled* prints, from yours truly,

ARCHIBALD BURNS.

4, Carlton-hill, Edinburgh.

[We do not think many of our readers will lose by the proposed exchange if they receive as beautiful pictures as Mr. Burns has sent to us.—ED.]

SALE OF METHYLATED SPIRITS.

SIR,—It is a curious fact that though parliament passed an act for the sale of methylated spirits of wine, free of duty, to be available in the arts, and of practical use for various purposes, at a third of the price of rectified spirits of wine, yet no chemist in this town can sell it under a penalty of a hundred pounds, unless he subjects it to a second adulteration, by adding shellac and calling it varnish.

Now I ask why was it methylated if it is to undergo a second process? It seems druggists can purchase it themselves, but are not allowed to sell it.

How do local revenue officers thus come to have the power to nullify acts of parliament? Your obedient servant,

Dublin. AGGRIEVED SPIRIT.

[We believe that the law only requires our aggrieved friend to undergo a second adulteration, if he is to be retailed in quantities less than two gallons. Methylated spirit may be sold as such with impunity in larger quantities.]

TO OBVIATE INJURIOUS EFFECT OF GUTTA PERCHA UPON THE SILVER BATH.

SIR,—Take shellac, 4 ounces, wood naphtha, 8 ounces, put into a bottle; shake up from time to time until dissolved; wash the article in *strong soda and water;* after, re-wash in clean water to remove the soda; coat the article either by immersion or otherwise, as may be convenient; dry, and if done properly, the varnish will be found an effectual and lasting remedy for the evil complained of, as gutta percha often contains small particles of iron, &c., from the circumstance of old gutta percha being often remanufactured.

F. D. . . . M.

TO CLEAN A GLASS PLATE.

SIR,—One of your correspondents recommends old collodion as being very good for cleaning glass plates. I think your readers would find the following less troublesome, and cheaper:—

Make a mixture of whiting and water (not strong); place in it the glasses to be cleaned; let them remain for about 12 hours, then take out, and set to dry; clean and polish, when wanted, with dry cloth or wash-leather. This method, although very simple, I have found to be the most effectual in removing grease, and in obtaining a brilliant polish.

G. N. B.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not put the plate into the bath too soon after coating with collodion.

If vertical lines appear on large plates after development, do not put the plate in the bath in the usual way, but reverse it, so that the *top* or *driest* part enters the silver solution first.

Always keep the dark slide of the camera covered with a black cloth during the exposure of the plate.

Do not be hasty in observing a change in litmus paper.

Do not let any silver solutions get too low in strength.

Do not spare any trouble in cleaning glass plates; breathing on them while holding them in a sloping direction. Don't do this in your operating-room.

Do not ever pour collodion without wiping the neck and top of the bottle.

Do not make a pause in immersing a plate in the nitrate bath.

Do not lift a plate from the bath too soon.

Do not put away any materials dirty, as dry dirt is less easily moved.

ANSWERS TO MINOR QUERIES.

PLATE-CLEANING LIQUID.—*A Subscriber* wishes to know how the solutions for cleaning glass plates are made. We have recently been making a series of experiments on this subject, and we think that we are now enabled to place our readers in possession of a receipt which, if used properly, will cause a failure from the employment of dirty glasses to be looked upon as a thing of the past. Place a couple of handfuls of common salt in a jug, and pour a pint of boiling water over it. Stir for some time, allow to cool, and filter. Mix together equal parts of fine rotten-stone and tripoli, and add about a teaspoonful of this mixture to every six ounces of the above saturated solution of common salt. To use it, shake the bottle well, and smear a little of the mixture over the plate, with the fingers or an old cloth. Now clean it well off, by briskly rubbing with a clean cloth, and give the last polish in the usual manner. The crystallisation of the salt, which takes place on the surface of the plate when the mixture is smeared over, seems to loosen the dirt from the surface in a remarkable manner, and the after friction with the cloth brings away all surface impurities. Care must be taken that no salt be left on the edges of the plates, or it will decompose the silver bath.

TONING GLASS TRANSPARENCIES.—*O. P. Q.* If, after taking the picture in the usual way, it is washed over with very weak chloride of gold, a greenish tinge is obtained, which is very good for foliage; by washing it over with perchloride of mercury, there is a more or less brown tinge given, according to the time it remains on; if it be kept on a long time, it becomes whitened. If, instead of developing the picture with pyrogallic acid, it is developed with sulphate of iron, it is at first rather feeble; but if that be washed over with sulphide of ammonium, it gives a rich brown. The ultimate colour of a picture can hardly be told when it is wet, the colour changing very considerably when dry. A wet picture has usually a reddish tinge, which disappears when dry. Some kinds of varnish restore that tint, others do not.

ALBUMINATE OF SILVER.—*O. D.* If dilute albumen or white of egg be added to a weak solution of nitrate of silver, a compound of oxide of silver with the albumen will be precipitated, which has been termed by chemists albuminate of silver. It is a white body, sensitive to light, by the action of which it is changed to a brick red colour.

EXTEMPORE SEL D'OR BATH.—*Oliver.* 8 grains chloride of gold dissolved in 16 ounces of water, and 32 grains of hyposulphite of soda dissolved in 4 ounces of water; add the solution of gold gradually to that of soda, agitating at each addition.

TO CORRESPONDENTS.

*** *An accident at the last moment has compelled us to omit our Lessons on Colouring from this number.*

W. L. S.—The only reference to Sir J. Herschel's newly discovered metal, junonium, will be found in the "PHOTOGRAPHIC NEWS," vol. i. p. 86.

ORIENTALIS.—To obtain a full-length portrait in your room you must use a lens of a very short focus—not more than 4 inches.

HIGHBURY.—We cannot give you a very definite answer to your question—it is so vague; you had better look about, and judge for yourself of the requisites for portability in a camera.

WELL-WISHER.—The substance you obtained was glycyrrhizine in a sufficiently pure state for photographic purposes. If required chemically pure, several further tedious operations will have to be performed, which would require the appliances of a well-appointed chemical laboratory.

K.—The question as to enlarging the pictures will be treated of shortly. A telescopic object-glass will not answer the purpose so well as a portrait combination. Wet collodion is the only feasible process. A camera capable of being considerably elongated will answer all your requirements, if it be properly supplied with lenses.

H. T. R. R.—Try to become *au fait* with the apparatus and processes now so generally in use before you attempt improvements. What you want cannot be yet properly managed, except by the most skilful operators.

H. S. I.—We are much obliged by your contributions of "What to avoid." Try the collodio-albumen process instead of Fothergill's; it seems to be more generally liked.

J. SANDERSON.—The prints are not very vigorous, but they seem to promise well, being so cheaply obtained. We shall be very pleased to have a description of your process if you will favour us with it.

M. E. B.—Varnish them with gum arabic, as recommended recently.

T. H. W.—1. Put a small stop in front. 2. Ocular inspection of a pressure frame will teach you more than we can afford space to describe. 3. Six months or more.

C. S. B.—1. We hope to be able soon to give further particulars. 2. Yes; not so good, however, as some we have given previously.

TYRO.—The spots are most likely due to the collodion, not the fixing solution. Study the lessons on colouring now in progress, and for the colours consult our advertising columns.

A. H. T.—Study the lessons on colouring.

AN OLD DAGUERREOTYPIST.—We are sorry we are unable to help our correspondent, but having never tried the process we are unable to give an opinion. The description was given correctly.

WILSON.—The kind of varnish you mention is just the one which is wanted, and we shall feel greatly obliged by our correspondent favouring us with the receipt. 30 grains to the ounce is equal to about 6 per cent.

G. C.—Add a few drops of an alcoholic solution of iodine: if that does not remedy it, the collodion is bad.

Hg.—Your first query is already answered. All photogenic lights make a terrible fume and smoke, and their success is very partial.

H. L.—You added too much carbonate of soda in the first place. Add a little acetic acid, a drop at a time, until it shows an acid reaction to litmus paper.

POOR TOM C.—The second formula is the best; try it with the addition of one drop of nitric acid to 12 ounces of the bath.

N.—The lens may be a very good one, but it is not large enough to cover the field of your camera. No arrangement of stops will remedy this.

Communications declined with thanks:—H. R.—J. A. S.—S. H. B.—J. B.—Phom.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Hg. Cl.—Edwin.—W. D.—C.—Tempus.—A Frenchman.

IN TYPE:—E. R.—R. W.—G. W. H.—H. C. J.—J. C. S.—Sen. Sol.—C. F. B.—Gilder.—W. R. S.—S.—H. T. T.—Foreigner.—W. H. W.—Iodide.—One of Devon.—T. Barrett.—J. T.—C. & M.—A. W.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 14.—*December* 10, 1858.

We have before us a full report of the proceedings of the last meeting of the Photographic Society; and should feel unwilling to give it the space which might be occupied by matter more interesting, were we not anxious to explain why the Council of this Society are desirous of exercising an exclusive control over the reports of its proceedings. The business of the evening was inaugurated by the announcement from the Chairman that Dr. Percy had retired from the office of Vice President, and by the notice of the withdrawal from the Council of the Right Honourable Sir George Clerk, Bart., and of the ordinary routine vacancies in the Council. Strange to say, the retirement of these gentlemen from office in this Society was unaccompanied by any observations upon the great loss which such retirement would occasion to any scientific society, and especially to one like the London Photographic Society, which has much need not only of the scientific ability of these eminent men, but of their matured judgment in influencing the actions of the Council of which they were two of the brightest ornaments. This silence is not prophetic of good, and the Chairman as the mouthpiece of the Council no doubt deemed it wise to pass over the misfortune in solemn silence. We appreciate the wisdom of the Council in adopting this course. But what are we to say of those members present who could hear of the retirement of the two gentlemen, one of whom (Dr. Percy) was, we believe, among the first originators of the Society, without an inquiry as to the cause of it, or without a single expression of regret or sympathy for the cause of a retirement in which only the Society can be the losers? But this apathy was followed by a reaction. The first moving cause which aroused the ire of the Chairman, and at once upset the usually placid urbanity of his demeanour, was what he appears to have considered the impertinent assurance of a member who dared to question the right of the dictatorial power of the Council in nominating for election those persons only whom they decide in secret conclave should or ought to supply the vacancies which occur in the Council. Now we have referred to the Society's rules, and we take the liberty of saying that the question was a very reasonable one, and one on which at no distant period the members may have good cause to ask themselves, why they permit an infringement of the right of free election of their representatives in the Council to grow up among them. We cannot suppose the members of this Society are less intelligent, or less independent, than those of other photographic societies; and yet, strange to say, the Council do not deem them competent to be entrusted with any real management of their own affairs. It is not, therefore, a matter of surprise to us, that the Chairman should have promoted discord by desiring, in a rather mandatory manner, the inquiring member to "sit down"; and successive repetitions of this imperious demand at once acted upon the meeting as a tocsin of discord. The confusion which followed defies description. In the midst of cheers and hisses, the Chairman was asked when the Council intended to fulfil the promise made by them in May last, to submit a rational and sensible code of rules for their consideration, in lieu of the regulations now in force, under which the Council exercise irresponsible power. To remind the Council of their breach of faith was evidently unpalatable, and the inability on the part of the Chairman to answer gave rise to expressions of disapprobation, and hereupon loud cries of "Carbon," "Carbon," arose. Then Mr. Pouncey, whose name has been of late rather prominently associated with the new process of Carbon-printing, stood forward to deliver, as it was supposed, an interesting lecture, illustrative of his alleged discovery. But the force of a bad example had its influence upon even Mr. Pouncey—he too had become infected with the disorder of the evening—and condescended to impart nothing beyond an attack upon ourselves and Mr. Fox Talbot in particular, and all others in general, who had not expressed approval of a process of which he calls himself the inventor; and of which he can give no other description than the production of a certain number of prints, while with an air of self-sufficiency he proclaims, "these beautiful prints are produced by my process, and I challenge any one, even Fox Talbot, to produce a silver print to equal them." There was, however, an oasis to be found in the evening's entertainment, which relieved it of its barrenness of utility, in what fell from the lips of Mr. Malone. This gentleman, in some well-directed observations, endeavoured to place Mr. Pouncey and his "beautiful prints" in their proper position in the scale of photographic art. But Mr. Malone might as well have been silent, for he only created additional excitement, which found vent in a cross fire or enfilading of the enemy, by an interposition of observations, not only remarkable for their oddity, but irritating in the extreme by their personality. The previous rashness of the Chairman brought on a *vis inertiæ*, which rendered him so insensible to the growing turbulence of the meeting, as to necessitate the rising of our good friend Mr. Vignoles to remonstrate against it.

The previous reputation of Mr. Hardwich might have been deemed of sufficient weight to restore a tone of sober seriousness to the volatile spirits of the meeting, but the result proved "there was nae luck about the house." For, as is witnessed in incantation scenes, to make up for the want of sense in the dialogue, resort is had to fire, flame, and smoke, and colours, red, green, and blue, are profusely generated in an invocation to bring up the "familiar fiend" of the operator; this sort of pantomime was enacted by the gentleman referred to, with the view to bring up the "familiar fiend," but with a vain result, for the "fiend" would not appear. In plain words, the operation proved a failure. "The paper was not so good as could be wished," and such like excuses, by way of palliation for the inability of the demonstrator to render that clear to the evidence of the sense of sight which his written paper has failed to convey to the understanding, inasmuch as that a barleycorn of information was lost in the bushel of chaff in which it was hidden. The subject having

failed to restore even a half-tone to the audience, left as much impression on its hearers as the secret of Mr. Pouncey's Carbon-printing process!

We hope we have done impartial justice to this exciting occasion. Can our readers now wonder at the objection of the Council to our publishing the proceedings which take place at their monthly meetings? We can now understand why the special organ of the Society is deemed the fitting channel through which the members who do not attend the meetings are to be apprised of the numerous exhibitions at head quarters, by a facile transposition of the whole genus of farces into genteel comedy or the more serious drama.

APPLICATION OF PHOTOGRAPHY TO WOOD ENGRAVINGS.

BY MR. R. HUNT.

Numerous experiments have from time to time been made to produce photographic pictures upon box-wood blocks, of such a character that the wood engraver would be enabled to work upon them. Hitherto success has not attended these efforts; but from some examples which we have lately seen, there is every reason for supposing that the desired end will shortly be accomplished.

It should be understood that there is not the slightest difficulty in producing very perfect photographic pictures upon box-wood blocks. Even by applying the nitrate or the chloride of silver to the surface of the wood, very satisfactory photographs could be obtained; but the difficulty in this case is, that the silver salt gives a brittleness to the wood, and it is liable to "chip off" under the tool, hence it is not possible to produce fine lines.

By coating the wood with albumen this has been avoided, but the wood-engraver complains of the presence of the film of albumen preventing him from working with his usual facility. This objection is, however, almost entirely overcome by the use of collodion, the attenuated film offering scarcely any obstruction to the engraver's tool. All that is necessary is, to adopt one of the so-called dry collodion processes, and to obtain from a good negative on glass a positive copy on the block. It is important that the processes should be simplified as much as possible, to avoid all risk of injuring the wood. It is well to coat every part of the wood, except the face, with a thin layer of transparent varnish, so that the iodised collodion may be applied, and the *face* dipped into the solution of nitrate of silver, without the risk of having any absorption. Again, in the slight fixing process which is necessary, no very high degree of permanence being required, this varnish also protects the wood. By employing a somewhat sluggish collodion process, very charming pictures may be obtained, and rendered sufficiently permanent.

Now arise the wood-engraver's difficulties. He has been trained to cut along certain well-defined lines, but he does not understand working upon a drawing in which there are none of these lines. It is, however, merely a question of education; the conventional system must be abandoned; and the engraver must be taught to use some judgment in the execution of his work. It has been proposed that practised draughtsmen should be employed to indicate, by lines on the photograph, where the wood should be cut. This would be still preserving the same mechanical system which at present exists. Something beyond this is required; and a class of engravers must be educated to work directly from the photograph, without any adventitious aid. We have before us a representation of an amphora, photographed on wood, and engraved by Mr. G. R. De Wilde, of Clerkenwell, which is in itself an admirable example of what may be done. This woodcut shows that no real difficulty exists in the production of photographic pictures upon box-wood blocks, which may be cut, and from which very beautiful impressions may be obtained.

The advantages of such an application are manifold. The truthfulness, in the first place, is one of its greatest recommendations; and for objects which have any relation to science, this is paramount to every other consideration. The rapidity of production is another advantage, since it would enable authors and publishers to be far more liberal in their illustrations than they can afford to be at present.

At this time we have engraving advanced to a high degree of excellence, and we very justly admire the results; but if we could at once transfer to the wood the copy of a negative on glass which represented some scene of sacred or historic interest, how much more satisfactory would it be to all! We know that the wood-engraver is supplied with photographs of machinery and other objects, which he copies with great labour by the pencil on wood. The same photograph on the wood should be at once available; and instead of the pencil, the wood-cutter should be instructed to use the graver. The perfection of such reproductions, as it regards the relative dimensions, distances, &c., and the correctness of all the details, would be unfailing recommendations. We learn that the wood-engravers of Germany are now availing themselves of photography to a considerable extent; and we hope we shall not be long before we have to refer to English examples of this most beautiful application to a very beautiful art.—*Art Journal.*

[We have recently succeeded in entirely overcoming all the difficulties which have hitherto prevented this application of photography from being generally employed; and in an early number we intend giving a full description of the process.]

ON AN ACTION OF LIGHT HITHERTO UNKNOWN.

BY M. NIÈPCE DE ST. VICTOR.

The following is an extract from the paper referred to, which was read by M. Chevreuil, the distinguished French Academician, at a meeting of the learned body of which he is a member.

In the two previous memoirs that I have published on this subject, it has been seen that the light gives to certain bodies the property of reducing the salts of gold and silver, and that this property continues to exist in bodies kept in darkness during a greater or less length of time, depending on the nature of the insolated body and the conditions in which it is placed after insolation.

The effects of which I am about to have the honour of informing the Academy, are similar to those referred to in the memoirs read on the 16th November, 1857, and the 1st March, 1858.

To evidence on porous bodies, organic or inorganic, the action of the light of which I am about to speak, it suffices, after insolation, to place them in presence of a sheet of sensitive paper prepared with the chloride of silver, or to pour on it a solution of nitrate of silver.

But, that the light may act on organic or inorganic substances, it is necessary that they should be finely divided; and that the action of the light on an inorganic substance may be rendered visible after its exercise by a colouring or reduction of the metallic salts—such, for example, as the salts of gold and silver—it is necessary, as is already known, and as I shall again demonstrate, that an organic body be present, at least if the salt be not a chloride, an iodide, or a bromide of silver.

Thus, for example, the division of matter suffices for the action of light to take place on the nitrate of silver and on the nitrate of uranium; but it does not suffice—for the colouring or reduction of nitrate of silver and nitrate of uranium, to reduce the salts of gold and silver.

I prove it by the experiments I have made, and the results I have obtained.

I first established the fact that the crystals of fused nitrate of silver were insensible to the light, if they were well crystallised and exempt from all organic matter; and the same

of the crystals of nitrate of uranium and crystallised organic acids.

The following are the experiments I made on the division of matter:—I poured on the freshly-broken edges of a porcelain plate (tendre or opaque), a solution of nitrate of silver which had been fused; I afterwards exposed it to the sun, having taken the precaution to protect the part from the light by means of a screen, and to preserve the other from all organic matter. After an insolation of about an hour, I could not perceive the slightest colouring in the insolated part; but the action of the light had taken place: for, when I poured on the edge of the plate a solution of chloride of sodium, I saw, after some time had elapsed in darkness, the chloride of silver blacken on the part of the edge of the plate which had been acted upon by the light; this same part blackened very rapidly if the whole were exposed to diffused light.

The results were the same if the edges of the plate were insolated, impregnated with chloride of sodium, and nitrate of silver was afterwards poured on.

On repeating these experiments on hard and vitrified porcelain, the same effects were produced, only more feebly, because it is the same thing as if one operated on ground glass.

If the edges of an opaque porcelain plate (freshly broken) are impregnated with a solution of nitrate of uranium, it will be in vain to insolate it, if there be no trace of organic matter; the salt of uranium will not reduce the salts of gold or silver, as it does when insolated in presence of organic matter: but the action of the light has taken place, for if one pours on the edge nitrate of silver containing a little starch or gum, and afterwards a solution of sulphate of iron or gallic acid, a colouring will be perceived on the insolated part; and the same results if nitrate of silver has been insolated.

To experiment with a soluble substance, the sheet of paper is most suitable, because it is at the same time porous and of an organic nature, which is indispensable for the action exercised by the light to be rendered evident.

To experiment with a soluble substance, a sheet of paper is impregnated, and left to dry in obscurity, afterwards exposed to the light, taking care to mask a portion of it by means of an opaque screen, or to cover the whole surface with a photographic negative. After the insolation, it must be brought in presence of a substance which shall be a re-agent for the insolated soluble substance, and a photographic picture is then developed; this induces me to say now that one may practise photography with the substance nearest at hand, or render visible the action of the light on every species of organic or inorganic substance, provided that a substance be employed as a developing agent, capable of entering into combination with the insolated substance.

The principal re-agents to employ for demonstrating the action of the light are, the salts of gold and silver, the tinctures of turnsole and curcuma, and the iodide of potassium, for ordinary paper of commerce sized with starch.

In many substances acted upon by the light, the activity communicated manifests itself, besides, by a remarkable insolubility: they may be washed in abundance of water without dissolving; humidity, especially if combined with heat, makes them very promptly lose the activity acquired by the insolation, and they again become soluble.

It is for the same reason that humidity and heat astonishingly accelerate the reduction of metals under the influence of light.

In a great number of cases the operations may be reversed, and the same results obtained; which I propose to demonstrate by citing some of my experiments.

A sheet of paper impregnated with a solution of chloride of gold, covered with a photographic negative, and insolated, produces an image when passed in a solution of nitrate of uranium, of sulphate of iron, of sulphate of copper, of bichloride of mercury, or of salts of tin.

Now, if one operates in an inverse manner, that is to say—if the paper be previously impregnated with one of the salts just mentioned, and afterwards passed in a solution of chloride of gold, the result will be the same. A sheet of paper impregnated with a solution of nitrate of uranium, insolated under a photographic negative, passed afterwards in a solution of red prussiate of potash, gives a beautiful red picture, which is fixed by well washing it in distilled water; the light has no sensible action upon it; heat or dehydration makes it pass to a maroon brown; but it reassumes its red colour by cooling or hydration. If it be passed in a solution of salts of copper without washing, and afterwards exposed to heat, it acquires different tones, according to the greater or less intensity of the heat. The primitive picture still reduces the salts of gold or silver, and if the red proof is passed in a solution of bichloride of mercury, and afterwards in oxalic acid, a picture is obtained by the action of the heat, almost identical with that obtained with the nitrate of silver, and which continues after the cooling; the red picture treated with sulphate of iron gives a blue picture.

A sheet of paper impregnated with the red prussiate of potash and insolated, will give the same blue picture, if passed in a solution of bichloride of mercury or acidulated water; this picture, formed of prussian blue, is greatly heightened by the action of heat, by the vapours of hydrochloric and nitric acids, by a solution of oxalic acid, &c.

On a sheet of paper impregnated with red prussiate of potash, pictures of different colours may be developed, either successively or simultaneously, by employing suitable re-agents—the salts of silver, of cobalt, and others.

A sheet of paper impregnated with gallic acid and insolated, treated with the iodide of potassium, gives a latent or feeble picture, which will become very vigorous if it be afterwards passed in the nitrate of silver. It is the reverse of what one does in ordinary photographic operations.

A sheet of paper impregnated with sulphate of iron and insolated, treated afterwards with iodide of potassium and nitrate of silver, gives an analogous result. Impregnated with gallic acid, insolated and treated with the proto-sulphate of iron, the sheet of paper will give a brown or black picture; the result will be the same if the operations be reversed.

A sheet of paper impregnated with bichloride of mercury, and insolated, gives a picture with the protochloride of tin, soda, potassa, and the sulphide of sodium.

A sheet of paper impregnated with the protochloride of tin, and insolated, gives a picture with the sulphide of sodium, bichloride of mercury, chloride of gold, and nitrate of silver.

A sheet of paper impregnated with chromic acid or red chromate of potash, and insolated under a negative, gives, with the nitrate of silver, a red purple picture, formed of chromate of silver; but it is the parts protected from the action of the light which give the picture; that is to say, that the chromate of silver does not form itself with the chromate of potassa acted upon by the light.

Many other metallic salts are equally sensible to the light.

The importance of the foregoing discoveries of M. Nièpce de St. Victor, may not at first strike the reader; nevertheless, it opens a field to photography almost as extended as chemistry itself, inasmuch as almost all soluble chemical substances are rendered available in the practice of the art. Take a sheet of paper and impregnate it with any soluble substance, let it dry in a darkened room, and then insolate it under a negative, take it back to the dark room, and treat it with any of the re-agents capable of combining with the substance operated upon, and you will have a picture of almost any colour you desire; for example, if the paper be impregnated with nitrate of uranium, exposed, and then treated with a solution of red prussiate of potash, a beautiful red picture will be obtained; and if this be afterwards treated with sulphate of iron, a fine blue picture will be produced; and if other re-agents be employed instead of the sulphate of iron, pictures of different colours may be obtained.

THE COLLODIO-ALBUMEN PROCESS.*

5th stage—Exposure.—As most operators agree that the development should not be delayed beyond two or three weeks, of course it matters not in what part of this period the exposure takes place. The time in this process need not be measured so exactly as with any other kind of sensitive plate or sheet, but an approximate idea only can be given. In summer, with sunshine, a stereoscopic landscape, lens with ½ inch opening, will average 1½ or 2 minutes. With a 16 inch focus lens, and ½ inch opening, from 5 to 7 minutes will be requisite; but in a deep wood I have had to expose 30 and 35 minutes, and even wet collodion would have taken 10, though the sun was shining brilliantly—so that the operator must judge for himself. If there are dark nooks and patches in his picture, he must expose for them, as he can remedy over exposure. In the next stage, which is

6th—The development, my method differs from the general one. I use

Saturated solution of gallic acid	... ...	8 parts.
Nitrate of silver, 5 grains...	... ...	1 part.
Glacial acetic acid, 5 drops ...	... ...	
Distilled water 1 oz. ...	... ...	

Pour water over the plate, then drain and level the plate, which is well done with a funnel placed in a round hole, cut in an old box, or board supported at each end. Pour upon it the gallic acid and silver solution; see that it covers the whole plate, and then it may be left ten minutes or thereabouts, when it must again be looked at, and if the details are not coming out pour off and add 1 part gallic acid solution, and one part silver. This will generally give the blacks greater intensity, and in time, betwixt 30 minutes and one hour, the negative should be fully out; but sometimes it takes much longer through under-exposure. A few days ago, I took some views on a peculiarly dark day, which were three hours in developing, although in the last hour I used an equal mixture of the silver and gallic acid solutions. Yet the whites are as transparent as though they had been exposed in summer, and developed in half an hour. The time taken by development seems long, and would be so for twenty pictures, but it is easy to develop three, four, or even a dozen at once. I always bring out a quantity at the same time, so that this quantity only takes the real time that one or two would if brought out singly. A good picture in this, as in every process, should have dense sky and the minute markings in the shade.

I before observed that this mode of developing differed from that in general use. My own, and many of my friends' opinion, is, that the above is the safest, and gives the best half tones. I have, however, known many operators who prefer the one more generally used; so I will give that as well, that the beginner may try both, and make his own choice—

SECOND DEVELOPING SOLUTION.

Gallic acid	... ...	1 drachm.
Pyrogallic do.	... ...	¼ "
Alcohol	... ...	1 "
Glacial acetic acid	... ...	1 "
Distilled water	... ...	20 ounces.

In a dish of this solution place the plate, and in a few minutes add a drop or two (not more) of a 40 grain solution of nitrate of silver to an ounce of water, and the development will be complete in an hour or two. If the blacks are not intense enough, or if the development seems to become stationary, add a few drops of the silver solution.

The measure which is used for the gallic acid and silver should be perfectly clean; indeed, it is the safest way of proceeding to wash the measure, after developing, with a strong solution of cyanide of potassium, and after that, well with water. Nothing remains now but the

7th—Fixing and varnishing.—It was the custom with many to use cyanide of potassium to fix the collodio-albumen negatives, but this I have proved to be a great mistake by fixing one by this salt, and another by hyposulphite of soda, and comparing them. In the first place, the time it would take to dissolve the iodide of silver out of the "whites" by cyanide, is long enough for the opacity of the "blacks" to be much—very much—injured. Again, very often it curls up the film, so that in drying, marks are left like cracks in the glass, and frequently it loosens the coating so that it leaves the glass. Hyposulphite of soda is free from all these faults, and if the plate is placed in a solution of 1 oz. of the latter to 6 oz. of water, from 10 to 20 minutes will suffice to fix it, which can readily be seen by the yellow colour leaving the unaffected parts transparent and clear. Wash gently, and leave the plate in water for an hour, renewing the water once or twice. Wash then, and dry by gentle heat, when it must be varnished. Each maker has the way to use his varnish marked upon his bottles—whether with heat or no. That which I use requires no heat, and is very good; but many prefer that which is applied whilst the plate is warm. But if the cold plate is used, it must be *perfectly dry.*

Causes of failure.—This I always look upon as a necessary chapter in the description of any process, as few photographers are chemists, and still fewer have any teacher to appeal to in case of failure. The greatest reputed drawback to this process is *blistering of the plates.* I never had but one blister out of hundreds of pictures; but my friends occasionally have had some great disappointments from this cause, and in every instance which I could thoroughly investigate I have proved that the plates were not dried properly after albumenising the collodion film, and almost always that they were stowed away damp after the last bath. This does not show until in developing small blisters rise like bubbles, and in drying leave a mark which is printed. I once, for a friend, developed a lot of scenes in the wildest part of Scotland, and none but an artist could imagine my vexation at seeing the most exquisite scenes I ever beheld, without any exception, come out, and then be spoiled by blisters like bubbles rising as thickly as rain-drops, and spoiling every plate.

My belief is, that if a man will use proper collodion, and attend to this particular, he need not meet with this failure. Neither thick nor thin collodion is the cause—that I proved, and stated my experiments in one of the journals; and I have come to the conclusion that it is either an unsuitable collodion or the want of dryness in the plates.

It will be understood that dust, which causes spots on the picture, must be guarded against.

Some of the advantages of this process seem to me to be—the keeping of the plates, which I have stated to be on an average three weeks. I have, however, last week been using a lot of plates prepared in August, and kept since then in a tin box: the results are as clear in the lights as if they were not a week old—the blacks are intense, and the minuteness and half-tone almost, if not quite, as perfect as I ever got. Surely this says enough for their keeping qualities.

Again, I am using the same silver bath which I have used two years; of course, having replenished it often with a 40 or 50 grain solution of silver. When it becomes deeply discoloured, as it does at times, I add a little kaolin, shake up, leave for a few hours in the light (I find the light aids it in clearing), then filter into the bath again. If the negative looks very dirty, when dry rub it gently with a soft silk handkerchief, and this will often remove this appearance, as it frequently arises from a deposit which takes place in developing; but this is very seldom the case if the things are clean.

The stages of this process seem many and intricate, but as this account is written for the younger students, it must be remembered that I have made them separate so as not to be overlooked; and I believe that some of them may be performed in a very little longer time than described.

My own belief is, that the first preparation, up to the time when the plates are dry, may be performed by daylight; but

* Continued from page 146.

let not the beginner try any experiments. The reason why I give this opinion is, that I was once preparing a lot of plates, when a friend of mine threw open the door, and the sunshine fell upon three or four before the albumen had been applied. These I marked as experimental, but in bringing out the pictures I could perceive no difference whatever betwixt these and others prepared in the usual manner.

As to the results of the above process, I must refer the reader to the editor of this journal; as he, having seen a few, is a less interested person than myself. Θ

[We can assure our readers that the pictures which our valued correspondent has from time to time forwarded to us as specimens of the collodio-albumen process, which he has so intelligibly described, leave nothing to be desired. We can confidently recommend the above paper to the careful attention of our readers.—Ed.]

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

4. *Sizing by Sulphuric Acid.*—It is known that by submerging a sheet of paper in sulphuric acid diluted with half its weight of water for a few instants, washing it in pure or ammoniacal water, and then drying it, a hard and resisting substance is obtained, to which the name of parchment applies very well. We treated many papers of different make in this way; but on submitting them afterwards to photographic preparations, we encountered serious difficulties. On coming out of the sulphuric acid bath and the washing-water, the paper curled in drying, and it was only with great difficulty that we succeeded in extending it on the salt bath, where it is besides necessary to submerge it; on being taken from this, as well as from the silver bath, it dried very slowly, and its desiccation was not complete at the end of three hours; finally it undergoes, under the action of heat, a considerable shrinking—so much so that, if the operator opens the printing frame in order to observe the progress of the proof, the fleeting instant during which it is relieved from pressure is sufficient to enable it to shrink perceptibly, and the consequence is, that the lines are doubled; therefore it appears to us difficult to bring this mode of proceeding into use.

Spots on the Positive Paper.—These spots may be divided into two distinct classes: those visible *à priori* offer but a trifling danger, for it is always easy for a photographer to choose pure paper, and to preserve himself from the consequences of spots of this description. The others, invisible *à priori*, are of more importance, not only because they often attain large proportions, but also, and especially, because it is impossible to preserve oneself from them by the most searching examination of the paper. The first division contains four kinds of spots:—1. Those opaque, of a deep brown, almost black, often attaining a millimètre in diameter, show themselves now on the surface, anon in the body of the paper. If some of these spots be isolated with great care, and calcined in the air so as to destroy the organic matter, they undergo no change, and the residue, which dissolves with difficulty in hydrochloric acid, answers afterwards to all the reactions of salts of iron. The nature of these spots is not doubtful, they are formed by oxide of iron; as to their action on the proof, it is sensibly null. After its development they appear in the same state as when the paper was free from all preparation. 2. Others, much more rare, show themselves of a clear blue colour; their nature is easy to establish; they arise from small portions of ultramarine used in giving a blue tint to paper. Moreover they are without any action on the development of the proof. 3. Others are simply formed of small fragments of straw. 4. Finally, others, which the microscope has brought to our knowledge, are formed of small particles of resin arising from the local decomposition of the resin soap employed in sizing. They do not, any more than the preceding, appear to exercise any prejudicial influence on the development of the picture.

* Continued from p. 137.

But let us now come to the spots we have provisionally designated as being invisible *à priori*. Everybody is familiar with the disastrous effects they produce on proofs. There, in places which previously offered no sign of impurity, they show themselves on the paper, when withdrawn from the hyposulphite of soda bath in the form of starry spots, reaching two and sometimes three millimètres in diameter; around these spots extends a white circle, or at least, one containing very little colour, often prolonged in a train of the same nature, which always follows the direction in which the liquid ran when the paper was hung up to dry.

The first point for us to examine was, the instant in the preparation when these spots were produced. We ascertained that the silver bath had no influence in producing them, and that they never appeared in that bath. But if we follow the proof from the nitrate of silver bath, we shall see the phenomenon manifest itself even in darkness. Some points speedily blacken, and this state of things goes on increasing up to a certain limit. Owing to a cause yet unknown, the nitrate of silver, which covers the sheet conjointly with the chloride, decomposes, and the silver crystallises; the liberated nitric acid remains around the spot and forms an acid "glory," which there is at first nothing to indicate. But when the sheet has slightly blackened in darkness, the acid circle which surrounds the spot (which is less sensible inasmuch as the central crystallisation has deprived it of a certain quantity of silver) does not blacken in unison with the rest; and if the blackened proof be passed on ammonia to fix it, the crystals remain, and all round them a slight circle is manifested, a little less coloured than the ground because less sensitive: if, on the contrary, it is submitted to the action of the hyposulphite of soda, the salt which is decomposed where the acid circle is, disengages sulphurous acid and sulphuretted hydrogen, which darkens the already partially-discoloured circle; while at the same time, under the influence of the hydrosulphuric emanations, the crystals of silver sulphurise while preserving their form.

The mode in which these spots are formed once known, it remained to establish the cause; different experiments proved that they were to be sought for in the pulp of the paper itself, that they were due to the presence in certain parts of traces of tin or copper left by the *cannelures* of the copper or bronze cylinders. The most certain remedy would be to replace them by steel cylinders; these would certainly give metallic traces from wear, but they would be far less numerous from the greater hardness of the metal, and besides the traces of iron would oxidise in the salt bath, and the resulting oxide of iron could not precipitate metallic silver. But a much easier and more simple method would be, after the refinement of the pulp, to submit it to a new bleaching with chlorine water, or, better still, a solution of hypochlorite of lime heated with a dilute acid.

Effects of the Salting.—The object of salting is to introduce a soluble salt in the paper, generally a chloride, capable of forming, with the nitrate of silver, an insoluble silver salt, upon which the light afterwards exerts its action.

Influence of the Concentration of the Salt Bath.—We have prepared with this reagent solutions of a strength of from one to ten per cent., and printed under the same negative the papers thus differently prepared; the result was remarkable, and the difference between one and two, and two and three, well marked. The tint of the proof, at first weak and red, ascended rapidly with the increase in the quantity of chloride, but soon went beyond the red tones to others deeper, and ended ultimately in black opaque tones, a result which, we may safely affirm, few photographers would imagine. Chemical analysis soon gives the reason of this phenomenon, for it shows that the greater the strength of the bath, the more of soluble chloride the paper absorbs,

and, by consequence, the more silver it appropriates in its passage through the nitrate bath.

Influence of the Duration of Contact between the Paper and the Salt Bath.—After dividing a sheet of paper into two parts, we salted the first by a simply floating on the bath, the second by a total immersion, the contact otherwise being for the same period in both cases. No considerable difference was afterwards seen between the pictures obtained on the two halves.

To inform ourselves of the influence of the time of contact between the paper and the salt bath, we placed on it pieces of paper which we left one, five, ten, and twenty minutes. The proofs obtained on these pieces of paper under the same negative presented very slight differences; and these were always uniform, that is to say, the augmentation of the quantity of salt led to blacker and more vigorous tones.

Indeed, the mode of using the salt bath, and the time of contact between it and the paper, are matter of little moment as regards the final result.

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

To choose the Photograph.—To produce the best results, it is necessary that the photograph be a good one; but all good photographs are not equally suitable for colouring. An over-exposed flat positive can never be made a good picture by any process; a slightly under-exposed but otherwise well-managed photograph may sometimes, however, present a fine specimen of *chiaroscura*, and be worth retaining as a good, vigorous, uncoloured picture, whilst any attempt to colour it with powder colours would probably render it heavy and muddy. A positive most suitable for colouring should be properly exposed, and sufficiently *well-developed* to secure purity and intensity in the lights, which should have a somewhat chalky surface, presenting what is termed in crayon drawing a "tooth" to the colour. A bright metallic positive, with a surface glossy in the lights as well as the shadows, sometimes looks exceedingly well as an uncoloured picture; but is difficult to colour, and unsatisfactory when done. A photograph with dull, tawny lights, cannot be expected to make a brilliant-coloured picture. The face should be well lighted, without heavy, abrupt masses of shadow. It is no part of our province in this series of articles to speak of the operative department of photography, but we may remark, *en passant*, that the proper lighting of the model is one of the most important, and, at the same time, least studied and most imperfectly understood, duties of the photographer. A well-lighted picture makes the work of the colorist infinitely more pleasant, and enables him, with comparatively small trouble, to produce good results. We need scarcely add that the picture should be sharp, well-defined, and as free as possible from stains and spots.

To Colour the Face.—It is well to begin the picture with the flesh tints. Three or four varieties of tone and depth will be required, which are usually distinguished by the manufacturers by numbering them; but as this mode of nomenclature varies, we will describe the colours. In our practice we use four fleshes, and two or three complexions. No. 1 dark and No. 1 fair are extremely pure and delicate tints, suitable for the high lights of flesh, and sometimes for the local colour in ladies and children. The first is somewhat of a cream colour, and the second similar, but a little less yellow in tone. No. 2 dark and No. 2 fair are deeper in tint, and are used for the local colour of the respective complexions to which they are suited.

Before proceeding further, we may remark that a variety of modes of using dry colours have been adopted by different persons. Some colour on the collodion film, and leave it so; others colour thus, and then finish with varnishing; whilst others varnish first, and colour on the varnished film. Neither of these plans gives the best results. The mode we have long followed with success, and which we recommend as securing the most solidity, permanence, and brilliancy, is to colour the picture throughout, or nearly so, on the collodion film; then varnish and colour the entire picture again. In proceeding with the first colouring it must be remembered that the varnish will materially modify the brilliancy and depth of the applied tints, and that therefore they may possess much greater intensity than is required in the finished picture.

Begin with the forehead, using a delicate creamy tint such as we have described as No. 1 flesh. A small portion of colour is to be taken up at the point of a camel-hair pencil, and applied with a light circular motion, commencing on the high lights, and softening gently into the shadows, working well up to the edges of the hair, but taking care not to touch it. With the same tint colour the high lights of the nose, cheeks, and chin. Next proceed to use the local flesh colour, applying it to the remaining portions of the face; commencing as before on the prominent parts, and softening towards the shadows. In doing this, the outlines of the features must be carefully traced, avoiding the deep shadows of the nostrils, eyes, and lips. A small portion of colour must be taken up at a time, and applied with very gentle pressure. The tyro will easily acquire a good method if he endeavour to fancy that the features really possess the relief which their light and shade indicate, and follow with his pencil the undulations which would then exist. Very little colour should be applied to the shadows and half tones—just sufficient to tint without in any degree obscuring them. The retiring shadows of the forehead may be carefully touched with a grey formed of carmine and green mixed to a cold or warm tone, as the complexion may require. The shadows in the socket of the eyes and those of the mouth may be touched with a similar colour. The shadows of the nostrils and of the ear may be touched with carmine, or carmine and dark brown. The lips should be coloured with a tint prepared for the purpose, or with carmine, taking care to preserve their exact form—avoiding the shadow between them. The iris of the eyes, if blue or light grey, may be touched with a suitable tint; but if dark grey or hazel, they are, unless the head be on a large scale, best untouched.

We may here remark that many colorists simply apply a uniform coating of a suitable flesh tint over lights and shadows, and finish by heightening the colour of the check with carmine. We need scarcely add that pictures thus coloured are immeasurably inferior in artistic effect to those in which some attempt is made to give both lights and shadows their appropriate tints, and thus to secure depth, brilliancy, and harmony.

(*To be continued.*)

Photographic Chemistry.

WATER (*continued*).

We are familiar with water under three conditions, as ice, liquid water, and steam, and in all three conditions it is still the same substance, a compound of 1 equivalent of oxygen and 1 of hydrogen. Water augments in volume on freezing, and to restore it to its former condition a considerable amount of heat is required; hence the common remark, that it feels colder at the commencement of a thaw than during the frost, is to a certain extent well-founded.

The action of heat on water is to render it *aeriform*; it is converted into a vapour, and in this condition occupies a space 1,700 times greater than when a liquid. Pure water boiling in an open vessel always retains the same temperature, no matter how intense the heat applied, provided the barometer remains at the same elevation. If, however, the pressure of the column of atmospheric air on the barometer be diminished from any cause, and the mercury descends, water boiling at that moment will be less hot than when the rising of the mercury indicates increased pressure of the

atmospheric column; hence water boils at a considerably lower temperature on the top of Mont Blanc than at the bottom of one of our deepest coal-mines. Under the same circumstances, however, distilled water always boils when the mercury in the thermometer attains the same elevation; and upon this fact, together with a similar one observable in the freezing of water, the thermometrical scale is based.

Water, as it is found in a state of nature, is never chemically pure, the nature of its impurities differing according to the ground through which it has percolated; these impurities often rendering it unfit for operations in photographic chemistry. The most youthful photographer knows what hard water is, and this hardness is caused by the presence of sulphate or other salts of lime; the presence of lime it is easy to detect by adding a little oxalate of ammonia; and the presence of sulphuric acid may be ascertained by means of the nitrate of barytes, acidulated with pure nitric acid. In the event of sulphate of lime being present, on adding the first test oxalate of lime is immediately precipitated; and in the second case sulphate of barytes is precipitated, both substances being insoluble.

Under certain peculiar circumstances water may deposit its mineral impurities; hence the formation of deposits, incrustations, petrifactions, and so forth.

Pure water does not act on tincture of litmus; nor is it disturbed by the addition of nitrate of silver, nitrate of barytes, oxalate of ammonia, lime water, or the hydrosulphate of ammonia, which reagents test the presence of sulphates, carbonates, chlorides, lime, or metals. When evaporated on a glass or platinum plate it does not leave the slightest residue; and this is the character of distilled water.

Rain water may generally be employed as a substitute for distilled water in photographic operations, provided it is is caught only after the slates or tiles have been well washed. For washings common water will answer very well, especially if it be filtered; but for the baths containing iodide of potassium, nitrate of silver, and gallic acid, pure water is requisite; although, in case of necessity, river water may be substituted even in these cases, if a few drops of nitrate of silver be first added, and the water then filtered with the view of freeing it from the precipitated chloride of silver.

Neutral Solvents.—Water is employed in photography to dissolve different chemical agents, and to place them in a condition to be transferred to the paper or plate; all bodies capable of dissolving without altering these chemical agents may be likewise employed for a similar purpose; thus in certain preparations, alcohol, ether, and other liquids are employed.

(*To be continued.*)

Dictionary of Photography.

ACTINOMETER (*continued*).—MM. Fave and Silbermann have examined the action of the solar light on a mixture of chlorine and hydrogen, and have employed the facts which they have observed in measuring the chemical influence of the different coloured rays of the spectrum. They filled fifty small glass tubes, placed in an upright position along the sides of a narrow trough—the gases being confined over salt water, whilst they were exposed to the solar spectrum. The level to which the salt solution rose in the various tubes under the influence of light, rendered the chemical action of the coloured rays evident to the eye. Fave and Silbermann state, that they have found the greatest action to take place in the morning at the line H, at noon at the line G, and in the evening at F.

M. Claudet has also devised an instrument which he terms a photographometer, by means of which we are enabled to measure, not only the intensity of the chemical rays, but also the relative susceptibility of the plates or chemical papers, which have been prepared according to different methods. The plate or paper is attached at the lower edge of an inclined plane, and covered with a metallic plate, which is perforated horizontally with a row of equi-distant round holes. A second disc slides along the inclined plane, in which there are corresponding holes of 1, 2, 4, 8, 16, 32, and 64 millimètres in diameter. This second plate is fixed in a black cloth, which moves with it, in such a manner that the rays of light can only impinge upon the prepared plate during the time which the openings of the moving plate occupy in passing over those in the one at rest. It is evident, that the ratios of the periods of operation for the adjacent perforations must be as 1, 2, 4, 8, &c. When a very weak light is employed, as in instituting a comparison between the solar and lunar light, it is necessary to let the moveable plate fall repeatedly, and to calculate the ratios of the intensities accordingly. If we wish to compare plates that have been prepared according to different methods, they must be placed in juxtaposition, and two moveable plates allowed to slide down at the same time, as the intensity of the light varies every minute. M. Claudet has ascertained, by means of his apparatus, that pure solar light renders iodo-bromide of silver susceptible to the vapour of mercury in $\frac{1}{1000}$th of a second. He considers the apparatus adapted to solve the following questions:—What is the effect of the compound light, and what that of the separate rays of the solar spectrum? What is the amount of loss in the chemical rays by ordinary or total reflection, or by refraction through lenses? What is the intensity of the chemical rays in the various sources of light? What influence does the atmosphere exert upon the chemical rays?

Professor Draper has devoted considerable time to the study of the chemical action of light; and more than twenty years ago he commenced experiments, with the view to invent some means for measuring the chemical action of light with some degree of exactness. His first essays were by noticing the degree of blackness which was produced on papers coated with chloride or bromide of silver. He subsequently described an instrument which was well adapted to these inquiries. This he described in a paper published in the *Philosophical Magazine;* and it is from this, and other papers by the same experimentalist which he has communicated to that journal, that the present account of his researches is taken. The instrument, to which he has given the name of tithonometer, consists of an arrangement by which there may be obtained from hydrochloric acid by voltaic decomposition a mixture of equal parts of chlorine and hydrogen. This mixture will remain without change in the dark, but on exposure to the rays of a lamp the two gases unite in proportion to the incident light. So great is its sensitiveness, that an electric spark which lasts, it is said, less than the millionth part of a second, affects it powerfully when at a distance, and sometimes occasions an explosion which destroys the tithonometer. Messrs. Bunsen and Roscoe have recently introduced several improvements and refinements into the tithonometer; and in a paper which they read before the Royal Society, they have brought forward many important discoveries in photo-chemical science which they have been enabled to make by means of this instrument. They belong too much to the domain of abstract science for us to lay them in full before our readers. The apparatus which these physicists have contrived for this purpose is most ingenious; and, although too complicated and delicate for any other purpose than an instrument of pure research, promises to be of the highest importance in all inquiries into the laws which regulate photographic phenomena. Messrs. Bunsen and Roscoe have obtained several remarkable results with their instrument; one of them is, that the presence of a very minute quantity of a foreign gas introduced into their standard mixture of chlorine and hydrogen was capable of offering great resistance to the combination of the gases, a small quantity of hydrogen in excess diminished the sensitiveness by two-thirds, whilst a little more than one per cent. of oxygen almost entirely prevented

combination. Their researches have also shown that the observations of Becquerel, which induced him to assume the existence of certain rays which could continue but not commence chemical action, may be explained without having recourse to the hypothesis of the existence of a new property of light. They have also discovered a very important law governing the chemical combination of a mixture of chlorine and hydrogen, and which it is reasonable to suppose equally well applies to the other cases of combination or decomposition induced by the agency of light, which is, that "for a given amount of chemical action effected in the chlorine and hydrogen an equivalent quantity of light is absorbed." These experimentalists have also noticed that the chemical rays from various sources of light are very different in quality, and that the chemical rays reflected at different times and hours not only possess quantitative but also qualitative differences, similar to the various coloured rays of the solar spectrum; and they conclude their elaborate paper by a reference to the influence which these qualitative differences in the chemical rays exert on the photo-chemical phenomena of vegetation. They state, "that this influence must be of the greatest importance is evident from the varying effects produced in other photo-chemical processes by differences in the solar light." We must only mention, in proof of this assertion, the fact well known to all photographers, that the amount of light photometrically speaking gives no measure for the time in which a given photo-chemical effect is produced, and that a less intense morning light is always preferred for the preparation of pictures to a bright evening light.

(To be continued.)

A Catechism of Photography.

WAXED PAPER PROCESS—*(continued.)*

Q. What is the chief advantage gained by the employment of waxed paper in photographic operations?

A. The chief advantage of the waxed paper is, that it will keep well in hot weather. It has been urged as an objection to the paper process that the paper will not keep a sufficient time after excitation to answer the purpose of travellers, who are compelled to carry about with them a portable tent, and all the necessary apparatus for manipulation. Such difficulties are immediately overcome by the use of the waxed paper process.

Q. Are there not a variety of methods employed by photographers in the application of the waxed paper process?

A. There are several different plans all founded on the same principles, as in most other branches of photography.

Q. Describe another process from that which has already been stated; what is the first thing to be done?

A. In proceeding to detail another process the first operation is to wax the paper on a sheet of heated iron, and to be careful that the coating of wax is even and regular.

Q. What is the second?

A. The second part of the operation is to immerse the waxed paper in a bath of iodide of potassium.

Q. How long should the paper be immersed?

A. From half-an-hour to two hours.

Q. How is the solution to be composed?

A. To a quantity of boiled whey is added iodide of potassium, 4 drachms; bromide of potassium, 60 grains; sugar of milk, 5 drachms. When the paper is removed from the bath, it is dried between two sheets of blotting paper.

Q. What is the third operation?

A. Sensitising in a bath of aceto-nitrate of silver, composed of nitrate of silver, crystallised acetic acid, and pure water. The paper is floated in the bath for one or two minutes, washed in distilled water, dried between flat surfaces, and exposed in the camera.

Q. What is the fourth operation?

A. That of the development of the negative proof, which is done by immersing it in a solution of gallic acid; after which it is washed several times in pure water.

Q. What is the fifth operation?

A. Fixing the proof. This is accomplished by immersing it in a solution of hyposulphite of soda, washing it again in pure water, and then drying it by the fire.

M. GEOFFROY'S PLAN.

Q. What is the process adopted by M. Geoffroy?

A. In his experiments on the waxed paper process M. Geoffroy hit upon a new and more expeditious mode of conducting the operation; it is called the ceroleine process.

Q. How is the operation conducted?

A. In the first place M. Geoffroy places five hundred grammes (about eighteen ounces) of yellow or white wax in one litre (about a quart) of alcohol of commercial strength in a glass retort, and boils the alcohol until the wax is completely dissolved; having previously attached a receiver to the retort to collect all the products of the distillation, he then pours the still fluid mixture into a glass vessel, and as it cools, the myricine and cerine solidify, while the ceroleine remains in the alcoholic solution; this liquid is separated by straining it through fine linen; and by a final operation it is filtered through paper in a glass funnel. This mixture, kept in a stoppered bottle, may be used when required.

Q. How does M. Geoffroy continue his process?

A. He dissolves five drachms of iodide of ammonium (or potassium) in five ounces of alcohol, together with fifteen grains of fluoride of potassium or ammonium. Taking a capsule he pours drop by drop upon fifteen grains of iodide of silver as much of a solution of cyanide of potassium as is required to dissolve it. This dissolved iodide of silver he proceeds to mix with the former solution, shaking it briskly. There remains at the bottom of the bottle a thick deposit of all the above salts, which serve to saturate the alcohol with which that already saturated is successively replaced.

Q. Having prepared these solutions, how does M. Geoffroy proceed?

A. These two bottles being ready, when about to prepare negatives he takes about six ounces of solution No. 1, of ceroleine and alcohol, and mixes it with five drachms of solution No. 2. Filtering the mixture with care so as to avoid crystals, which spot the paper, he makes a bath in a porcelain dish in which he immerses the paper five or six pieces at a time, continuing to do so until the solution is exhausted. After being taken out, suspended on a hook, and dried, these papers, which are of a very uniform rosy tint, are covered up from dust and kept dry. They are sensitised by nitrate of silver. The development of the image by gallic acid, and the fixing the proof by the application of hyposulphite of soda, are accomplished by the ordinary method, generally following that of LeGrey, to which M. Geoffroy adds fifteen or thirty grains of camphorated spirits of wine to one quart of a solution of gallic acid.

Q. What are the peculiar advantages of the plan adopted by M. Geoffroy?

A. The process according to the formula of M. LeGrey is slow and tedious when compared with that of Geoffroy; and very great care is necessary both in the selection and application of the materials. By Geoffroy's plan the iodising and waxing of the paper are effected in one simple and rapid operation; the absorption is, as may be supposed, very uniform and complete, from the facility with which alcohol penetrates, and that granular appearance which is so objectionable in ordinary waxed processes is avoided, owing to the properties of the ceroleine.

Q. Is the solution of ceroleine in alcohol easily made?

A. It is, and at a cheap rate; and the residue of stearine and myricine may be employed with success for waxing fixed proofs.

Q. Are negative pictures taken by this process equal in every respect to those taken by the process of LeGrey?

4. For the transparency of the proofs, the intensity of the blacks, or the clearness of the whites and half-tints, they are equal if not superior to those taken by any other process.

(*To be continued.*)

Photographic Societies.

PHOTOGRAPHIC SOCIETY.—ORDINARY GENERAL MEETING, *7th December*, 1858.—R. FENTON in the Chair.

ON Tuesday evening last the Photographic Society held the second monthly meeting of the present session. There was a large attendance of members, owing, no doubt, to the announcement that the subject to be discussed was the "Carbon process," about which there has lately been so much noise made. There were several photographs exhibited illustrative of various experiments which have recently been tried by photographers, and communicated to the "PHOTOGRAPHIC NEWS." We noticed also exhibited a series of stereoscopic slides, executed by Mr. Sedgefield, of which we shall have occasion to allude in a more extended notice. They seemed to give general satisfaction, and the remarks which were passed upon them fully confirmed our own views. There were also some photographs exhibited, and we believe executed by Dr. Diamond in Germany—views of places which the novelist Mr. G. P. R. James has rendered familiar to the readers of English fiction—Heidelberg, &c. In the landscapes there was a great nicety of half-tint, and the foliage of the trees was well rendered, although we think that, if the picture had been printed a little darker, it would have been better. There were also some architectural views by the same artist, but of these we cannot speak highly: they lack that fineness of detail in which Mr. Fenton excels, while they were printed so exceedingly dark that the foliage is a mere black mass, utterly indistinguishable. The sites are not so happily chosen as those of the landscapes, and this does much to mar the beauty and interest of the picture.

We would also remark that it is extremely pedantic to describe a picture in the German language. It may be complimentary to the country from which the scenes were taken, but we apprehend that there are many who would be totally at a loss to know what they were about, except through the recurrence here and there of a proper English name, or of that of some well-known town.

We must here again revert to an omission to which we called attention in No. 11, in reply to a correspondent who kindly corrected an error into which we fell in our notice of the last meeting, owing to the absence of any description being attached to some of the photographs exhibited. There were some views by Mr. McCraw, but of these we could gather no tidings, although we *presume* they were specimens of his new ink process, with which readers of the "PHOTOGRAPHIC NEWS" are familiar. There were also some views exhibited by Mr. Elliot, but what they were we are unable to inform our readers. We can only surmise that they were some specimens of a new mode of printing. If so, they lack vigour and brilliancy, being uniformly light, and comparatively indistinct in tone. We can only say again on this subject that we should be extremely glad if the secretary would avail himself of our suggestion, and append to each set of photographs exhibited at the various meetings something descriptive of them, otherwise we lose one half of the good attending the society's meetings.

And now we come to the most painful part of our notice. There were exhibited several portraits, and a view executed by the late Mr. Robert Howlett, he who has been so successful in obtaining the enlarged pictures of the moon from Mr. Delarue's negatives, mentioned in No. 10 of the "PHOTOGRAPHIC NEWS." The portraits were of Mr. Phillip, A.R.A., Mr. P. H. Delamotte; and a grouped picture. They were exceedingly well done, and bore the characteristic neatness and clearness of Mr. Howlett's manipulation. We shall not soon forget his admirable series of photographic portraits of the English artists, and these were even an advance upon them. The architectural view was also one of the most beautiful things we had ever seen. It was a view of the "Palais de Justice, Rouen." There was such microscopic minuteness of detail, and such an admirable arrangement of light and shade, pervading the picture, that we were enabled to inspect in the minutest manner the architectural decoration of this fine building. It no doubt will surprise and pain many of our readers to hear of his death. He was present at the last meeting of the Society, and when we had the pleasure of speaking to him he apparently enjoyed the best health. By his death photography has lost a loving disciple—one who has done much to promote and elevate the art; and had he been spared, he would no doubt have done much more to promote the cause. He was only twenty-seven years of age. The Chairman very feelingly alluded to the deplorable circumstance, and passed a well-merited eulogium upon him as a photographer and a gentleman.

We have in our leader referred to the scene which followed, and will therefore only say that, after a great deal of noise and confusion, Mr. Pouncey introduced himself to the meeting, and commenced a long account of his visit to London on the last occasion, and endeavoured, in a most heavy manner, to be facetious at the expense of the "PHOTOGRAPHIC NEWS." But as that was scarcely palatable, he was called to order by the meeting, and received a sharp and well-timed rebuke from Mr. Malone, for indulging in personalities before a meeting of scientific gentlemen. After much recrimination, and not very complimentary language on the part of Mr. Pouncey, Mr. Malone proceeded to give an able, elaborate, and succinct account of the various photo-lithographic processes; after which Mr. Hardwich offered some experiments, which, by that fatality which generally attends this gentleman's proceedings, were not attended with desired success.

Mr. Pouncey then proceeded to ask the Society to pass opinions upon his own processes, to the disparagement of silver printing; and then, as a wind-up, he asked the Society, at all events, to pay his expenses up to London, which cool request, we need hardly say, was received with loud laughter and ironical cheers.

MANCHESTER PHOTOGRAPHIC SOCIETY.

A MEETING of this society was held on the 1st instant, at the Literary and Philosophical Societies' house, when Mr. Sidebotham presided.

Mr. Mann, the Honorary Secretary, read the annual report of the society for the past year, of which the following is a copy:—

"The Committee of the Manchester Photographic Society, in presenting to the members the third annual report, are glad to be able to state that the debt which had been imposed upon them by their exhibition at the Mechanics Institution has been entirely discharged, and that the Treasurer's account shows a balance in his hands of £13 10s. 1d.

"The meetings of the society have throughout the past session been numerously attended; and much interesting information has been received and imparted in the conversations which usually follow the reading of the paper for the evening.

"The following subjects have been brought under the notice of members in the form of papers:—"On Colouring Photographic Slides for the Magic Lantern," by Mr. Sidebotham; "On the Oxymel Process," by Mr. Mann; "On the Artistic Arrangements of Photographic Landscapes," by Mr. James Mudd; "On the Optics of Photography," by the Rev. W. P. Read; and at one of the meetings the council were favoured with the attendance of Mr. Ackland, who gave some useful particulars as to the lenses of Professor Petzval, and introduced a compact stereoscopic camera with single lens. Professor Roscoe also called the attention of the society to the measurement of direct sunlight, as measured by Mr. Campbell's sun-dial; and Mr.

Dancer, to some curious marginal appearances; and Mr. Noton, to a variable stop contrived by him; and Mr. Sidebotham, to a lens cap for taking instantaneous portraits, and to a contrivance for carrying two or three plates in a small compass.

"The society's illustrations have not been continued, there appearing to be no sufficient demand for such expenditure of the society's funds: the council for the ensuing year will probably devote their early attention as to their continuance or not, or for the purchase of published works of excellence for the society's portfolio, or of instruments for the use of members. The thanks of the society are due to several members for donations to the society's portfolio, which has been further enriched by the replacement of the prints by Mr. Braun which were damaged at the Art Treasures Exhibition, the new set being even finer than the former. The sub-committee appointed in November last to examine the various processes for keeping prepared glass plates, have reported generally in favour of the collodio-albumen process. From the specimens lately exhibited by members, the council are glad to see that their attention is again called to the production of larger pictures; at one time it was feared that stereoscopic photography was engrossing too much of their attention.

"During the past year several subjects of the highest importance have occurred; among these may be named M. Niépce de St. Victor's discovery of some of the latent properties of light, and Mr. Fox Talbot's new process of Photoglyphic Engraving. It does not appear that many amateurs have taken up the former subject; but the last is one which seems destined to work a considerable change in the progress of photography among the fine arts. In the chemical department Uranium Printing has also attracted considerable attention; and Sir J. F. W. Herschel's discovery of the photographic properties of Junonium seems likely to do the same. Several new processes, or modifications of old ones, have been announced; among these, the principal are Mr. Pothergill's Dry Process, and Mr. Pouncey's method of Printing in Carbon.

"The art position of photography is daily becoming one of more and more importance. Private enterprise, unfettered by connection with any society, has been led to establish an independent journal for its especial behoof. No exhibition of art-manufactures is complete without its photographic department. Books and newspapers are daily becoming more indebted to photography for illustrations. The landscape painter is often under the necessity of resorting to the camera for accurate information of details attainable by no other means. Of portrait painting a recent critique says:—"Indeed portraiture has long ceased to be a distinctive school among us, and the recent inroads made upon its rewards by the wonders of photography, encourage but little hope for its future." It is also of increasing utility to the scientific man in a variety of ways; to the chemist, as a test; to the meteorologist and astronomer, as a faithful recorder; and to the literary man, as an accurate copyist. It has made itself useful to the anatomist and surgeon; and to the microscopist it has laid open an entirely new field; whilst to the engineer and mechanic it has become no less indispensable.

"It seems incumbent, then, upon all practising the art, whether as amateurs or professionally, to do all in their power to advance its progress. Every scrap of information should be carefully stored up, and laid open for the use of all; the greater the freedom with which this is done, so much more rapidly will photography advance to its proper place in the list of useful arts. It will be the duty of your council to further us as much as possible in this object; and they believe that by a combination of energy such as the society affords, much may be accomplished."

The treasurer's accounts were then read, when the report and the accounts were approved of, and adopted by the meeting.

The president stated that Mr. Mabley had suggested to him a process for printing in carbon which possessed much ingenuity, and might prove a matter of great importance. Mr. Mabley said that he felt some diffidence in bringing the subject before the society, as he had at present no satisfactory results to show; but as he believed the proposed method was correct in theory, he was anxious to obtain the co-operation of his experimental brother members.

Having worked at the carbon process of Mr. Pouncey, he was impressed with the difficulties arising from its mechanical principle, he was therefore induced to look for some other source of carbon; and as sugar is readily decomposed by sulphuric acid, the oxygen and hydrogen being in correct proportions for forming water, it appeared that this substance might be employed for the end in view. To a solution of bichromate of potass and gum the sugar was therefore added, the mixture spread upon paper and exposed under a negative, the resulting picture was then washed to dissolve the unaltered bichromate, the sugar on those parts being removed therewith, but remaining imprisoned with the reduced bichromate. The picture was then floated on sulphuric acid, and the decomposition of the remaining sugar afforded a picture in carbon, but unfortunately the tissue of the paper was completely destroyed. The president said that he had that day tried Mr. Mabley's method, and thought there was much promise in it; he stated that if the paper were thoroughly dried before the application of the sulphuric acid, it would not suffer, but would be converted into artificial parchment. Mr. Mabley said that the same principle of operation might be adopted for other pigments instead of carbon, for, by combining a salt in solution with the bichromate, washing it after exposure to light, and then treating it with a reagent, a precipitate would be formed on the altered bichromate, without the possibility of injuring the lights, as one of the elements calculated to form the picture would be removed from them by washing before the other was applied. Mr. Dale remarked that he thought the theory a good one, and commented upon the subject. The president then called the attention of the meeting to the important fact discovered by Mr. H. Young, namely, that pictures could be developed in the daylight—the iodide of silver having been previously dissolved away by hyposulphite; it was considered that this might lead to very important results. Mr. H. Young showed a very good positive stereoscopic print on glass, which he had developed in daylight, and explained how the idea first occurred to him. Mr. Dancer remarked that, if Mr Young had tried to develop in the dark after dissolving off the iodide of silver, he would perhaps have failed, and that it had been established by experiment, that a picture might be developed in daylight by previously washing the plate in a solution of iodide of potassium. Six large and very beautiful sun prints from collodio-albumen negatives were presented by Mr. Mabley to the society's portfolio.

Mr. Pyne exhibited some carbon prints taken by Mr. Pouncey, and which were considered very good—one being particularly admired. Mr. Dancer, having brought a lantern and the requisite apparatus, occupied the rest of the evening by exhibiting numerous transparencies taken by the members with various processes, most of which showed very beautifully on the screen; and after a vote of thanks to Mr. Dancer, the proceedings closed.

Photographic Notes and Queries.

SEDIMENT IN DEVELOPING COLLODIO-ALBUMEN PLATES.

Sir,—A correspondent of the "Photographic News," vol. i. p. 118, signed "Delta," complains of a sediment staining his collodio-albumen plates when using rain instead of distilled water, and for his information I beg to state that neither distilled nor rain water will prevent this deposit, and your advice (judging *à priori* what course bodies possessing gravity should take) would seem, at first sight, to cure the evil. But the plate face up or face down makes not the slightest difference, the deposit will form placed either way; indeed, I have sometimes imagined the deposit to be more dense with the plate face down. The most effective cure is, simply to provide a fine and soft camel-hair pencil, or—what is better, and what I always use—a piece of fine and clean cotton wool; and, during development, the plate must be carefully watched, and from time to time brushed freely and lightly with the cotton wool.

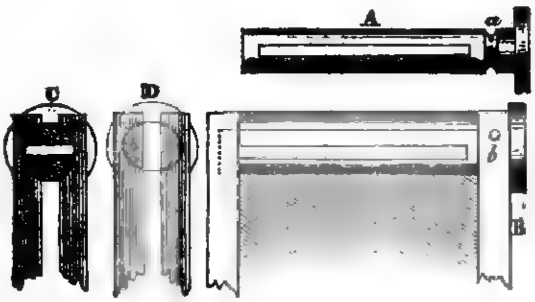
No injury need be apprehended to the negative, as all preparations where albumen is used (being thoroughly coagulated) are very tough, and will bear a good deal of brushing. Should the deposit, through oversight, have formed on the plate, the cotton should be soaked in the developing solution, and rather vigorously used until the plate is clean, renewing the cotton when it gets dirty, as a

further preventative to the formation of deposit. Not more than one drop of silver to the drachm should be used for developing. PETER HENDERSON.

LID FOR NARROW OPENINGS.

SIR,—The accompanying is a description of lid for narrow openings, which I think will be found more convenient and compact, also less liable to open accidentally, than the ordinary slide, which may be used for admitting the plates into the camera back, or on the bottom of the dark box for letting them out.

In the figure A is the lid, the action of which is exactly similar to that of an ordinary stop-cock; it is passed through one side of the box, and enters partly into the opposite one as shown



at B, and is held in its place by the pin *b*, passing across the narrow side of the box so that its side goes into the groove *a* turned on the lid. C D represent the lid shut and open. It may either be made of hard wood or brass; the former answers perfectly well unless the box be very narrow, when brass may be preferred. Perhaps this may be of service to some of your readers. J. W. ROBSON.

STRUCTURELESS COLLODION.

SIR,—In consequence of your observations in a previous number of the "PHOTOGRAPHIC NEWS" on a structureless collodion suitable for the production of microscopic photographs, I have been induced to offer a word or two on the subject.

Some time ago, at the request of one of the principal opticians in this city, I made a number of experiments with a view to arriving at an easy and certain method of making a collodion for that purpose; and if the very beautiful pictures which he produces may be taken as a proof of the success of my experiments, I have no hesitation in recommending the following formula.

The pyroxyline should be made with acids of the strength and at the temperature recommended in my communication at vol. i. p. 122, but substituting papier Joseph for the cotton, and continuing the action for fifteen minutes.

Pyroxyline	4 grains.
Iodide of cadmium	2 "
Iodide of ammonium	1 "
Bromide of ammonium	½ "
Alcohol S. G. ·800	6 drachms.
Sulphuric ether S. G. ·750	2 "

The pyroxyline generally dissolves in a few minutes, without leaving a trace of insoluble matter, although I have occasionally found it to require a few hours; in such cases placing the bottle in warm water will immediately effect the desired result.

21, *Dundas-street, Edinburgh.* J. NICOL.

SPOTS ON COLLODION PLATES.

SIR,—Can any of your readers inform me of the reason and remedy of the following?—On taking a stereoscopic picture of the interior of a church or cathedral, small, round, opaque spots frequently occur in the first picture, and sometimes in the second; on taking a second picture in the same position, the same spots occur in the same place on the plate. The negatives are perfect and good in other respects. It does not arise from dust, or long exposure, because pictures of exteriors, or country scenes, taken in dusty situations and exposed equally long, are free from them.

I would give a caution to all operators respecting the keeping of glass plates: never let them remain with pieces of newspaper between them, for, however you may clean the glass afterwards, you can never get rid of the grease which is in the printers' ink, and which is apparent on the plate, immediately after sensitising, in the shape of small and large elongated spots which, when exposed, become on development black opaque lines, which entirely destroy the beauty of the picture. W. H. W.

PHOTOGRAPHIC PROPERTIES OF "HENNA."

MR. EDITOR,—That important photographic chemical, nitrate of silver, has long been employed in this country as a hair dye. In India I believe that a simple vegetable agent is used for the latter purpose, and it is by no means an unimportant question whether it could be employed as an auxiliary in the photographic art.

The Indian plant to which I allude is called "*Henna.*" The powdered leaves, when applied to the hair, produce, by the simple action of light, a brown dye of any required degree of intensity. Under ordinary circumstances I am not sure that the Henna will produce the same effect in this country as in the sunny East—in fact, a specimen I once saw would not—but under the powerful influence of the lens, and, perhaps, in combination with other chemical agents, Henna would form a useful addition to the photographic materia. Perhaps some of your Indian friends could enlighten us on this subject. The chemistry of the vegetable world, with its colouring so gorgeous and yet so varied—and so intimately connected with solar influence—would form a splendid field of investigation to the photographic chemist. SENSITIVE SOL.

MIXED IODIDES IN COLLODION.

SIR,—In one or two communications I have observed that in the directions given for collodion for specific purposes, there has been a combination of the various iodides, viz., in Fothergill's process—iodide of cadmium and ammonium. My own experience discards cadmium, as with it there is a difficulty in getting intensity, but with ammonia it is all I want, being the more easily decomposed salt of the two; therefore, what benefit arises from the combination of cadmium? IODIDE.

[The objection to cadmium salts is, that they tend to make the collodion glutinous, and there is also some difficulty in getting a good intensity with them. Were this not the case, their superior keeping qualities would make them preferable to other less stable compounds in the manufacture of collodion.—ED.]

GLAZE FOR PAPER POSITIVES.

SIR,—"Da Lucem" asks for the method of imparting a glaze to stereoscopic pictures. As the method has been found out by hard labour and numerous experiments on my part, and as it is no secret, I give it to you as follows:—for printing use paper albumenised with *pure* albumen and chloride of sodium, ammonium, &c. &c. (no water as is generally used), print as usual after washing and drying. Float the prints on a bath of *dilute* alcohol and water for three or four minutes, dry, then mount and roll them; next take albumen, whirl it, let it stand for three or four hours, keeping free from dust, until the liquor has drained clear, then with a camel-hair brush (broad) varnish your print, taking especial care only to use the brush one way, and then set aside to dry. W. H. W.

GLASS POSITIVES IN LOCKETS.

Sir,—If you think the following worthy a place in your columns, it is at your disposal.

An easy method of cutting glass positives for brooches, lockets, &c. The picture is focused the size required in the usual way, viz., say a plate 2½ by 2. When the picture is dry, lay upon its surface the glass of the locket or brooch, and mark round by the edge of the bezzle (with any sharp instrument), which leaves the size that the glass has to be cut to; take a diamond and cut the glass square close by the edge of the mark; then cut off the corners. Now take a pair of cutting nippers (watchmaker's), and snip off the edges, until you get it to the proper size. The glass requires no grinding or filing, and may be done altogether in five minutes. G. W. H.

IN PHOTOGRAPHY REMEMBER

That generally more rapid impressions are to be taken in spring—less rapid in autumn.

That materials of dress are better as they reflect more light—*e.g.* silk and satin are better than velvet.

That colourless collodion is quickest—when yellow, give more exposure—when reddish brown, more still.

That more pyrogallic and less acetic acid is required in your negative developing formula in cold weather.

That in landscapes the duller the weather or object, the larger the stop should be—decrease its size as either brightens.

That in washing positive prints, it is change of water, not long soaking that is required.

That positives over-exposed are black and gloomy.

That positives under-exposed are white and misty.

That negatives over-exposed are long in developing, and have no detail in shadows.

That negatives under-exposed are quick in developing, and look reddish.

ANSWERS TO MINOR QUERIES.

Gelatinising Positives.—*C. A. S.* To the best gelatine add cold water, in the proportion of an ounce of the latter to a scruple of the former; place it near the fire, and, when dissolved, strain it through muslin. Take a piece of plate glass, wash it thoroughly, first with water in which common soda has been dissolved, and afterwards with clean water; drain. When dry, adjust it level, and pass over it a sponge dipped in ox-gall, taking care that every part is wetted. Before the gall dries, pour the hot gelatine on the glass, assisting it with a small piece of paper. About 1½ oz. is requisite for a plate 12 inches square. Protect it from dust, and leave it from half an hour to six hours, according to the state of the atmosphere; the precise time may be ascertained by gently laying a finger on the surface, when, if the print of the skin remains in the dent thus made, it has set sufficiently. Lay the picture, face downwards, on the gelatine, taking care to avoid air-bubbles. Should any accidentally appear, they may be stroked out with the finger, applied at the back of the picture. Leave all some hours to harden thoroughly. When perfectly dry, run a pen-knife round the margin, and it will then come off the glass with ease, presenting a highly polished surface, and having the details of the drawing much more distinct than they were before. Pictures thus gelatinised require to be mounted, as they are apt to curl up. Care must also be taken never to touch the polished surface with a warm finger, as the least damp injures the gloss.

To keep a Solution of Gallic Acid.—*H. B.* Dissolve 2 ounces of gallic acid in 8 ounces of alcohol (60° over proof); to hasten solution, the flask may be conveniently heated by immersion in hot water; when cold, it should be filtered, mixed with half a drachm of glacial acetic acid, and preserved in a stoppered bottle for use; so prepared, it will keep unaltered for a considerable length of time. The gallic acid is not precipitated from this solution by the addition of water; consequently, if in any case desirable, the development of a picture may be effected with a much stronger bath than the one usually employed. To obtain a solution of about the same strength as a saturated aqueous solution, half a drachm of the above would require to be added to 2 ounces of water; but for many purposes we prefer a weaker bath, prepared by mixing half a drachm with 10 ounces of water. In either case, it will be found necessary to add solution of nitrate of silver in small quantities as the developing picture seems to require it.

Mounting Photographs without Cockling.—*An Amateur* wishes for some information respecting mounting photographs on cardboard. He applies to the back of the photograph a thin paste, made of white starch (a small portion of gum arabic being added to make it more adhesive); when used it is of about the same consistence as the starch used by laundresses. The picture is mounted in the usual way, but as soon as it becomes dry it is sure to *shrink*, or *cockle* as it is called, and no pressure will make the surface level. The cement used by our correspondent is about the best we know, and we should recommend all amateurs to use it in preference to the ordinary flour paste. The cockling is owing to the photograph expanding when damped with the starch paste; and then, on drying, contracting and drawing the cardboard round towards it. This can be remedied either by well damping the cardboard before pasting down the picture, and thus causing *it* to expand equally with the picture, or, better still, by cutting a piece of paper exactly the size of the photograph (and of the same kind of paper), and pasting it on the *back* of the mounting board when the picture is pasted on the face. As they dry, the cardboard will be pulled equally in two opposite directions, and it will act as did the celebrated Captain M'Heath under similar circumstances—the card will obey the pull of neither of them, and will remain perfectly flat.

TO CORRESPONDENTS.

Y. P. S.—Are you sure that the age of the collodion has anything to do with the shrivelling up of the film on varnishing? We have frequently used the same kind of materials without ever experiencing the fault you name.

A. & W. M.—We are obliged by your offer, but we have already seen specimens of the processes you name, and have given our opinions on some of them pretty freely in the last number but one.

A Brother.—The hints are very good, and we shall be pleased to receive more of them.

A. B.—The collodion on paper picture was no doubt properly fixed, but the opacity of the paper deceived you.

E. M.—We will endeavour to obtain the desired information.

J. H. E. T.—1. We cannot give you an idea as to what the spotty appearance is caused by unless you give us more information. 2. When a paper positive is first immersed in the hypo. bath it has a peculiar dirty, curdy look by transmitted light, but that gradually disappears on staying in the hypo., and gives place to a delicate, uniform appearance, similar to ivory—the picture is then fixed. 3. We have given several varnishes in recent numbers; that by Sphynx we like best. When your plan of fixing prints is perfected, we shall be pleased to hear from you.

F. Smith.—It was inserted in the next number.

J. B.—The prints shall be sent. We are much obliged by the enclosed beautiful stereogram. We have forwarded a communication to your address.

White Ladye.—1. and 2. We have described a very good method of argentometry in a recent number. 3. We know no better than the ordinary positive developer such as we have previously described. 4. Metallic Cadmium. We feel flattered by your remarks; it is and always will be our earnest endeavour to deserve being called "The Times" of the Photographic press.

One of Devon.—We are much obliged by our correspondent's suggestions, but we would rather not be the medium of transmitting the proposal to our contemporary. Would it not be better for our correspondent to write to the editor himself? The use of the copal is to give a *grain* to the plate so that it will hold the ink.

J. L. P.—Further information shall be given as soon as possible.

Agate.—Newman.

A Wood Engraver.—In an early number.

J. S. O.—If kept in the bath for more than ten minutes, the picture will be sufficiently fixed.—We do not like them.

H.—We are much obliged by your kind letter; we will give further particulars as soon as possible.

W. Hopper.—We shall be pleased to be enlightened on the "Dark Process."

A Subscriber.—1. Yes, if warm enough. 2. Porcelain. 3. Yes.

W. H. W.—If you are as satisfied with your discovery in six months time as you are now, we will, with pleasure, give our readers the benefit of it. At present we are sceptical.

Leresour.—The only way to manage, if you do not wish to make many alterations in your camera, is to have the dark slide arranged for glass plates 8¼ inches square, and then take two separate pictures of the same object at the required distance apart. Add a grain bromide of cadmium to each ounce of collodion.

In Type:—R. W.—J. C. S.—C. F. B.—H. C. J.—A Foreigner.—T. Barrett.—Aliquis.—One of Devon.—H. T. T.—P. H. O's.—W. H. W.—Stereogram.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 15.—*December* 17, 1858.

We are exceedingly reluctant to occupy any further portion of our space in reference to the resolution of the Council of the Photographic Society; and, indeed, we believed it would have been unnecessary, for our remarks were so unanswerable that the Council made no attempt to reply to them in its own organ. We confess, however, that we had a suspicion that one or two of the members, who felt that they were referred to, would seek a less direct method of retaliating on us, and we fear that this suspicion has been realised. We are sorry for this. Had the Council replied to us in an article in the Journal for which they would have been responsible, no matter how illogical the arguments might have been, nor how deficient soever in the graces of composition, the writer would, at least, have confined himself to attacking the "Photographic News," and would not have descended to a scurrilous personal abuse of its Editor. We should not have experienced a sense of degradation in replying to the Council; but that feeling we do acknowledge on the present occasion. The attack that has originated these remarks comes from a quarter so utterly obscure, that we will not give the journal in which it appears—that which no doubt it hoped for—the publicity it would obtain by being quoted in our columns. Indeed, we should have refrained from mentioning it at all, and confined ourselves to carrying out our intentions of putting the law in force to punish the libellous attack that has been made upon us; but we owe it to those gentlemen who honour us with their esteem, not to pass by silently charges which directly affect the character of the Editor of this Journal, and consequently it may be said in an indirect manner the Journal itself. We will not enter again upon the question of the right of any public journal to report the proceedings of public bodies, we conceive that question to be completely settled; but we again affirm that we have no sort of ill-feeling towards the Photographic Society. We may not see that it is of any particular use to photographers, or that it has advanced the photographic art in any way, nor, indeed, do we believe it is in its power to do so; but we think that we have shown our willingness to be of service to it, in giving publicity to reports of its proceedings, and we certainly cannot see any method of proving more strongly our good-will. Unfortunately, it happens that the Editor of this Publication was, as all our readers are doubtless aware, the Secretary of the Photographic Society; and it appears to be the opinion of a few ill-disposed individuals, who have the means of making their opinions public, that because he was once in that position he must feel an enmity against the Society he formerly served. He was selected to conduct this Journal in consequence of his reputation as a photographer and a chemist; and it would have been absurd indeed in him if, because he had been connected with the Photographic Society (which connection ceased some time before this Publication made its appearance), he had refused to accept a post so honourable and influential as the editorship of the "Photographic News."

In conclusion we will observe that we bring no personal feeling of any kind into these pages. The object of our ambition is to maintain our present position by preserving the character, which the "Photographic News" undoubtedly possesses, of being the best and most complete photographic publication in existence, a fact that we conceive to be amply proved by its possessing by far the largest circulation of any journal of the kind—a circulation established in a period scarcely exceeding three months.

It is, perhaps, as well to mention, on the present occasion, that while the Editor fully and freely assumes the responsibility of every article published in this Journal, it is not to be assumed that he is himself the writer of it. The "Photographic News" possesses a large staff of contributors; and, indeed, it must be obvious to all who have any knowledge of such matters, that it would be impossible for him to be, in addition to the multifarious and responsible duties appertaining to the editorship of the "Photographic News," the author of all that appears in its columns.

TOTAL ECLIPSE OF THE SUN, SEPT. 7, 1858.

We have before us an abstract of the report of the Commission sent by the Brasilian Government to Paranagua, to observe the total eclipse of the sun on the above date, and communicated to the Royal Astronomical Society by Order of the Emperor of Brazil. It is divided into 14 sections, as follow:—

1.—Historical and introductory.

2.—Observations of times of contact, exterior and interior.

3.—Notes on the passage of the moon over the spots and faculæ on the sun.

4.—Notes on the visibility of the moon beyond the edge of the sun.

5.—On the colours of the sky, the sea, and of terrestrial objects during the obscuration.

6.—On the state of the limb of the moon, and on Baily's beads.

7.—On the intensity of the light of the sun near the limb.

8.—On the intensity of the atmospheric light during totality.

9.—On the corona.

10.—On the protuberances.

11.—Photographic observations.

12.—Measures of the distances of the cusps.

13.—Meteorological observations.

14.—Effect of the eclipse on men and animals.

The Commission left Rio about seventeen days before the day of the eclipse. Four stations were selected, including a chief central on the country house of Dr. Reichsteiner,

the Swiss Consul, on the sea shore near Paranagua. The weather seems to have been very unpromising, and rain to have been so frequent previously to the 7th of September, that little hope was entertained of success; but in the event the excellent arrangements made were not frustrated by this cause. Our space is too limited to give an account of the different phenomena observed and classified in each of the different sections; we will, therefore, only allude to the most curious appearances, and to the photographic observations, which, we are happy to say, seem to have been very successful.

4.—In this section several curious facts are recorded. In the early stage of the eclipse both M. de Mello and M. Liais were able to trace the contour of the moon to the distance of from 4′ to 8′ beyond the sun's limb. With one of M. Liais' telescopes, having an aperture of 3 inches, the image was observed by projection on a plate of ground glass, and the image of the moon was thus seen very distinctly, and remarked to be *whiter* than that of the neighbouring region of the sky: this appearance lasted for some time; it then became less marked, and at last was not distinguishable. Some photographs of this appearance were obtained by M. Liais, by the collodio-albumen dry process on glass, in which the effect was distinctly traced while the plates were still wet, on coming out of the gallic acid bath. M. Liais adds some remarks in explanation of the curious circumstances, that both in the photographic negatives, and in the projected positive image, the same effect was witnessed.

6.—The phenomenon of Baily's beads presented itself on both the disappearance and re-appearance of the sun.

8.—Several planets and stars were seen during the totality, and numerical results by Rumford's photometer of the degrees of obscurity are added.

9.—The corona appears, by the accounts of all observers, to have presented, on this occasion, an unusually complicated appearance. More than three independent observers agree in testifying to the appearance of 5 distinct brushes of light, reaching to an average distance of about 13′ from the moon's limb, of the form of a cone with convex sides, the base, equal to two-thirds of the height, resting on the moon. In addition to these were two brushes of white light radiating right and left, and of a thread-like texture; and on the east of the moon there was an emanation of feebler light. The light of the corona, forming the ground on which these brighter portions were seen projected, was remarked to be exceedingly unequal and patchy, and in many places to present the appearance of coarse rays, crossing and intersecting in all directions, but having no very definite exterior boundary.

10.—Several protuberances were also seen during the totality; but they are described as having been of a white colour, and only in one instance tinged with pink. At the commencement of totality three protuberances were found on the sun's east limb; the first two were vividly bright, with a black outline. On the west limb there were seen two others, in which a pink tint was noticeable. In a short time the protuberances on the east side were covered over, and a third one emerged on the west side (making six in all). At one of the inland stations, at Campinas, the two principal protuberances on the west limb were seen to be connected by a low dentelated bank of pink light, which was not uncovered to the observers at the central station. There seems to be no sort of connection between these protuberances and the solar spots and faculæ.

11.—This section is appropriated to an account of the means used for obtaining photographs of the disc, and of the results deduced. The abstract is silent as to all particulars on this interesting point, and we are left in ignorance as to whether any of the remarkable phenomena, recorded in sections 9 and 10, were fixed by photographic means. We are afraid not, since we are informed that 15 photographs only were taken; 9 before the totality, and 6 after, of which one failed to develop, and two others were spoiled by the instruments slipping. The positions of the cusps exhibited in this series of photographs enabled M. Liais to conclude that at the intended central station the centres of the two bodies passed within 1″·5.

THE COLLODIO-ALBUMEN PROCESS.

My Dear Sir,—In compliance with your request, I send a few particulars of the collodio-albumen process as at present practised by myself and many of the members of the Manchester Photographic Society.

As you have recently published the process in the columns of the "Photographic News," I will not take up your space by giving a *detailed* account of the process, which would be, in most respects, merely repeating what you have already written, but will make it as brief as possible; and, to any one requiring further information, I shall be happy to give it through the medium of the "Photographic News."

The plate is to be cleaned in the usual manner; immediately before use it should be rubbed over with a dry warm cloth, and then a large camel-hair brush passed over it to take off the lint.

The plate may now be coated with collodion, and sensitised in the ordinary silver bath. The collodion for the purpose should be not too thick, and allowed to set very well before immersion in the bath.

When the plate has been in the bath sufficiently long, take it out and place it in a dish of clean rain water; then wash it well under a tap, and rear up to drain; then pour on a little of the prepared albumen at the upper edge; run it round to each corner, and pour off; pour on and off a second time in the same manner; rear up to dry on a strip of blotting paper. The albumen is prepared as follows, and will keep good for years if required.

PREPARED ALBUMEN.

Albumen (white of egg)	1	ounce.
Water	¾	ounce.
Liquor ammoniæ	10	minims.
Iodide potassium	5	grains.
Bromide potassium	1	grain.
Solution of iodine (5 grains to 1 oz. alcohol)	2	minims.

Dissolve the iodide and bromide in the water; then add the ammonia and iodine; put this into a basin with the albumen; beat it well up to a froth, and allow it to stand a few hours; then filter through a piece of fine sponge, and put it in a bottle with a small piece of camphor.

When the plate is *surface dry*, hold it in front of a hot fire till it is quite dry and hot. Plates thus prepared may be stowed away in boxes, and, if kept dry, will remain good a long time; if taken in proper rotation in the various operations, no time need be lost, and twenty plates may be prepared easily in an hour.

To render the plate sensitive, immerse it for about half a minute in a bath of aceto-nitrate of silver; then remove to a bath of water; after which wash the plate very well with a stream of water. Most of the failures in this process are occasioned by a neglect of this. It cannot be too strongly insisted upon, that thorough washing is all important.

ACETO-NITRATE BATH.

Water	1	ounce.
Nitrate of silver	40	grains.
Glacial acetic acid	30	minims.

The time of exposure is a matter in which every one must judge for himself, according to the subject, lens, aperture, light, time of year, &c. It is well in all cases to expose sufficiently long, as an over-exposed picture can be made good, but an under-exposed one cannot. There ought to be very few touches, either of pure white or black, in a good photograph. An under-exposed picture gives plenty of both. The picture may be developed either with gallic or pyrogallic acid. I prefer the latter.

Pyrogallic acid	2	grains	filter.
Water	1	ounce	
Glacial acetic acid	20	minims	

Nitrate of silver	10 grains	}	filter.
Water	5 ounces	}	

Wet the surface of the plate with water; then pour on some of the pyrogallic solution, with the addition of a few drops of the nitrate of silver; pour the solution on and off a few times; the picture appears rapidly; and density may be easily obtained by adding a little more of the nitrate of silver, if required; wash, and fix with hypo as usual.

Should the film be a little liable to loosen from the plate, commence the developing with a weak solution of protosulphate of iron; wash it off; and then proceed with the pyrogallic and nitrate of silver.

Notwithstanding the publication of many modifications of this and other dry processes, I still think the collodio-albumen surpasses all others in the *certainty* and *beauty* of its results.

As to the *certainty*, I may mention, that a member of our Society has often occasion to travel fifty or sixty miles to take large photographs, for legal and other purposes. He takes his camera and a couple of collodio-albumen plates, and develops on his return home; never thinking to take the picture he requires in duplicate, being *quite certain* that his negatives will be exactly what he requires.

As to the *beauty* of the results, I send to-day, by rail, a parcel containing about a dozen photographs taken by this process, by as many members of our Society, and leave you to give your own opinion upon them.—Yours very truly,

JOSEPH SIDEBOTHAM.

[The above process comes before our readers and ourselves from such high authorities, and is the result of so many careful comparative experiments which have been carried on by a committee of the Manchester Photographic Society since November, 1857, that comment on our part would be quite superfluous. With respect to the prints which have been forwarded to us, they exceed anything we have ever seen of the dry processes. Usually, a print from a dry plate is characterised by a certain hardness and exaggerated intensity of contrast; and, however skilful the operator may have been, unless the proper exposure and selection of evenly-illuminated objects have been carefully attended to, this defect will be sure to make itself apparent on the finished print. Here, however, we have all the softness and beautiful gradation of half-tones which we are accustomed to look upon as the distinguishing characteristic of the wet collodion process; and this not merely in some slight degree, but in a perfection which we have rarely seen attained even by wet collodion. The pictures are all by members of the council of the Manchester Photographic Society. They are each so perfect, that it would be invidious for us to mention the name of any one gentleman in particular; but we are sure that we shall only echo the sentiments of the readers of the "PHOTOGRAPHIC NEWS," when we offer our thanks to the council of this Society for having enabled us to speak so decidedly as to the merits of this beautiful process. We must also congratulate the members of the Manchester Photographic Society in being so far ahead of the Metropolis as to have a council in which a good photographer is *not* a *rara avis;* a committee capable of understanding and performing its duties; and sufficient sterling common sense to show them, that a narrow-minded, selfish policy, is *not* the one best suited to advance the interests of the science of which they are the professed supporters.—ED.]

NEW PROCESS OF CHEMICAL ENGRAVING—STEEL-FACING ENGRAVED COPPER-PLATES.

BY E. ROBIQUET.

PHOTOGRAPHY having made such rapid strides so soon after its discovery, mediocrity in the art can no longer be tolerated. Regarded from the point of view of its correctness, the best designer cannot struggle against the expert photographer, but in point of taste and sentiment it is quite another thing. Far from injuring those who can comprehend nature, photography only gives them the most salutary lessons. The arts of reproduction, such as engraving and lithography, acted upon by this inevitable influence, seem to poetise themselves more and more. We have had an opportunity recently of observing fresh improvements applied to the ordinary processes of engraving by MM. Salmon and Garnier.

Two methods are still pursued to execute an engraving, whether on copper or steel. In the first, termed copper-plate, the artist designs directly, by means of the burin, on the metallic plate the subject he desires to reproduce, and nothing more remains to obtain the proof than to ink the surface in the ordinary manner.

In the second method the plate is first covered with a black varnish, upon which the design to be produced is traced in red. The engraver removes, with an etching needle, the varnish on all those parts of the plate in red; he then bites in the lines traced by means of nitric acid, to a greater or less depth according to circumstances. When the action of the acid has proceeded far enough, the plate is washed with abundance of water, and the remainder of the varnish removed with spirits of turpentine, and the plate remains only to be inked. This kind of engraving is termed etching.

Both these methods require great ability and considerable time; there is besides the danger that the length and nature of the work may lead to a certain hardness in the execution, and detract from the correctness of the reproduction. This danger cannot always be obviated, however great the talent of the artist may be. With the process of MM. Salmon and Garnier, no similar drawbacks are to be feared; it is the design itself which, once drawn on the plate, undergoes a chemical modification which enables it to retain the lithographic ink and to multiply itself *ad infinitum*. At one time this reproduction is obtained in relief, at another time in intaglio.

First Method—Chemical Engraving in Relief.—Everybody knows what English memorandum books are, on the paper of which one can write or design with a metallic pencil (zinc or lead) with the same facility as with a lead pencil on ordinary paper. In the chemical engraving in relief, it is on similar paper, and with a similar pencil, that the design it is desired to reproduce must be traced. This design is then exposed to the vapours of iodine, like a daguerreotype plate, until the lines forming the design have lost their metallic lustre and acquired an orange-yellow tint, due to the formation of an iodide of zinc, with excess of iodine. This image thus surcharged with iodine is quickly applied upon a zinc plate perfectly cleaned, then strongly compressed by means of a lithographic press. The iodide of zinc of the design abandons its excess of iodine to the metallic plate, and thus deposes on its surface a fac-simile of the design itself. A solution composed of lithographic ink diluted in soap water is then poured on the plate, precisely in the same manner as a photographer pours on collodion, and the plate is then washed with plenty of water. Wherever the plate remained naked the ink is washed off completely; but this is not the case with the iodised image, upon which the greasy ink has fixed itself perfectly. It is allowed to dry a little while, and a plate is thus obtained with which one can print proofs on paper precisely the same as with a lithographic stone. When by the succession of proofs pulled the impression becomes faint, a roller charged with ordinary lithographic ink is of course passed over the plate. The relief of the design may even be augmented by immersing the plate in a water bath acidulated with sulphuric acid, which does not touch the greasy impression of the image, and only attacks the naked zinc.

Second Process—Chemical Engraving in Intaglio.—The image being transferred to the zinc plate exactly as in the preceding method, the plate is plunged, not in a bath of dilute sulphuric acid, but in a solution of sulphate of copper, through which a galvanic current is passed, the zinc plate serving as the negative pole. Evidently the copper

held in solution in this new bath will deposit itself on the metallic parts of the plate, and form successive layers of copper upon it, while the parts of the plate protected by the design will remain unaltered. After this action has continued a sufficient length of time the plate is taken from the bath and washed with water. If the operation has been well managed a design will be seen which will have the appearance of being engraved on copper, and which may be employed in printing on paper in the usual manner.

MM. Garnier and Salmon soon saw that by this system their plates were everlasting, for when the surface of copper was worn by prolonged printing, it was only necessary to plunge it anew into the galvanic bath to replace the vanished copper. By reasoning further, they had the happy idea of seeking to protect the plates of ordinary engravings, and they have fortunately succeeded, not by forming on their surface a galvanic deposit of copper, but by covering them, by means of the pile, with a layer of iron. It is this process to which they have given the name of "*steel-facing engraved copper-plates.*" This metallic "varnish" protects the work of the engraver, and alone undergoes the wear and tear involved in printing. As it can be renewed as often as necessary, the last proofs are as satisfactory as the first. To those who may be sceptical we shall content ourselves with replying, that they have not feared to submit to the steeling bath the plates of Henriquel-Dupont, Mercury, Calametta, Beaugrand, Alexandre Jazet, and others.

Not content with these perfections of the old process of engraving, MM. Salmon and Garnier desired to vanquish photography on its own ground, and this is the course they took.

Direct observation had taught our indefatigable inquirers that a mixture of bichromate of ammonia and cane sugar, dissolved either in water or alcohol, and spread over a surface —whether of metal, glass, or paper—formed a kind of varnish highly hygrometric so long as it remained in darkness, and drying rapidly when it has been exposed for a certain time to the light. Without troubling themselves to inquire what was the chemical reaction under the influence of the solar rays, MM. Salmon and Garnier saw in this precise and simple fact an arm capable of overthrowing the processes employed by photographers in the printing of their positive proofs. These processes have been described so many times that it is not necessary we should recur to them. Let us content ourselves with describing the new method we are considering, and let us suppose that it is a question of producing on glass a picture intended to be viewed by transmitted light. To commence this, a liquid must be prepared, in a chemically dark place, which is composed of a solution containing ten parts of sugar-candy and two parts of bichromate of ammonia in five parts of water, which is further diluted with five parts of absolute alcohol, and filtered through paper. This liquid is poured on glass in the same manner as collodion, and dried over a spirit lamp, giving to the plate a continuous rotatory motion, precisely as in the photographic albumenising process. An albumen positive proof is applied on this glass, and the whole fixed in a printing frame and then exposed to the light during a space of time varying from one to ten minutes. The solar rays pass freely through the transparent parts of the picture, serving as a negative, and dry, in these parts, the bichromate of ammonia varnish; while the varnish under the black parts is completely protected from the action of the light, and entirely preserves its hygrometric virtue. The half-tones undergo, as will be readily understood, an action intermediate between the preceding.

When the time of exposure to the light has been sufficiently prolonged, and this can be taught by experience alone, the frame is removed to the dark room, and the plate prepared with the bichromate dried again very gently, and the surface brushed rapidly over with a badger-hair pencil dipped in perfectly dried charcoal powder. This powder attaches itself to all the parts remaining humid; and as its adherence is as much the more strong as the drying action of the light has been more vivid, it results that the blacks of this new design correspond to the blacks of the negative—that is to say, the parts where the light has not been able to traverse. Everywhere, on the contrary, where the solar rays have been able to act freely, the surface will be dried, and it will be impossible for the smallest particle of the powder to adhere. Finally, in the half-tones an effect will be produced which holds a middle place between the whites and blacks. In a word, the picture will be reproduced exactly as it shall have been given, and as often as may be desired. To give it all the fixedness desirable, it will suffice to wash it with alcohol and varnish it. Transparent proofs will thus be obtained of great beauty and sharpness, which rival the most satisfactory proofs on albumen. The future reserved for this process may be imagined when one reflects that in this way every species of design, of engraving or lithography on paper, may be produced by it, on the simple condition of rendering it transparent by a varnish, or by prolonging the exposure to the light sufficiently. This is not all, for any powder, no matter what, may be used to replace the carbon, provided it be insoluble in water and perfectly dry. One may, therefore, produce designs of different colours, or, otherwise, use enamel powder to obtain proofs on glass, which, passed through the fire of a porcelain kiln, will become veritable stained glass. If, instead of executing the design in enamel powder on glass, it is applied to the porcelain biscuit, it will be easy to fix it by fire, and a new branch will thus be created in the ceramic art.

By modifying a little the proportions of sugar and bichromate contained in the sensitive liquid, and using slightly albumenous water as a solvent instead of the alcohol, it will be possible to operate on paper as well as on glass; and proofs may thus be obtained imitating, in a wonderful manner of the finest engravings or lithographs.

Let us now suppose that a man has in hand a photograph taken either on glass or paper, and that he desires to transfer it to a zinc plate to obtain a real chemical engraving either in relief or in intaglio: nothing will be more easy after what we have said, and he will have resolved the problem of seizing nature by means of photography, and of multiplying the proofs *ad infinitum* by means of engraving. Suppose, for example, that a photographer has been sufficiently clever to obtain on paper a clear picture of a horseman at full gallop, or a vessel under full sail, and that it is a question of transferring this image to a zinc plate. First of all the photographic proof must be rendered transparent, by being impregnated with a turpentine varnish, then it must be applied on a sheet of paper prepared with the bichromate in a room feebly illuminated with artificial light, and the two exposed to the action of the solar rays for about ten minutes. This time having elapsed, they must be taken again to the dark room, the photograph taken off, and the prepared sheet breathed on lightly. Instead of producing the image with the charcoal powder, a pencil dipped in finely pulverised zinc or iron must be moved about on its surface, and the details of the photograph which served as a negative will speedily make their appearance. The metallic picture thus obtained on paper is exposed to the vapours of iodine, and then transferred to the zinc plate in the manner described above. The remainder of the process is also described above.

Such are the principal improvements which we have been allowed to inspect, and which appear to us calculated to introduce great modifications, not only in the domain of engraving and photography, but also in the ceramic arts. Let us hope that MM. Salmon and Garnier, after discovering processes as ingenious as easy to carry out, will succeed, as they propose, in applying them on the large scale.

The business world at Vienna has been thrown into a state of alarm by the discovery that a number of photographic forgeries of bank notes are in circulation. Hundred-florin notes of the Vienna Bank have been reproduced with such perfection, that it requires an experienced eye to distinguish the forged from the genuine notes.

DEVELOPMENT OF AN IMAGE AFTER FIXING.

Towards the close of the proceedings of the Manchester Photographic Society, which we reported in our last number, p. 166, Mr. Sidebotham, the president, called attention to an important fact which had lately been discovered by Mr. H. Young, namely, that pictures could be developed in the daylight, the iodide of silver having previously been removed. The great importance of such a discovery both in a theoretical and practical point of view impressed itself so strongly upon us, that we at once wrote to Mr. Sidebotham, requesting that he would place our readers in possession of the results of some experiments which he had informed us were in progress. Our request has been responded to in the most courteous manner, and we have great pleasure in laying before our readers the following letter. The plate mentioned therein is most remarkable, considering the way in which it has been produced; the effect is that of a slightly over-exposed picture on collodio-albumen; the light parts are very pure, and the half-tones are well rendered. There is, however, a want of density in the dark shades, which, instead of being opaque, have that peculiar greenish yellow appearance which is the characteristic of over exposure. Viewed as an illustration of a fact which bids fair to subvert all our preconceived theories on the subject, this is one of the most extraordinary pictures we have ever seen.

"*Manchester, December 13th*, 1858.

"Dear Sir,—In compliance with your request, I send you an account of some experiments on the curious fact brought before our last meeting by Mr. H. Young, that a sensitive plate may be impressed with an image, the iodide of silver then removed, and the image developed in daylight. A collodio-albumen plate was sensitised and exposed the usual time, then put into a dish of hypo. and well washed, all traces of the iodide of silver having disappeared; it was then taken into a light room and reared up to dry in the window. I carefully examined the plate under the microscope, but could detect no trace of alteration in the film where the latent image was. Three days afterwards I developed the image with the ordinary pyrogallic and silver sollution in a dark room. I send you the identical plate; you will perceive that the image is composed of different shades, varying from yellow to orange brown. This experiment I have several times repeated with a like result, except that the plates were only kept one day before development.

"With plates prepared with collodion merely, or preserved with syrup, I could obtain no image; nor with plates cleared from the iodide with cyanide of potassium. With plates prepared by the collodio-albumen process, and by that of Mr. Fothergill, the results were precisely the same.

"When the film had loosened from the plate, it was impossible to wash the hypo. out, and the image was spoiled by it, and made uneven; but when the film was firmly attached the image was clear, and the lights brilliant. It is needless to say that the above experiments prove very little, but that little is of great interest, and may lead to important modifications in our photographic processes. Yours very truly, "Joseph Sidebotham."

PHOTOGLYPHY.

The readers of the "Photographic News" have already had an opportunity of seeing the last discovery of Mr. Fox Talbot, and we have now to announce that a still greater advance has been made by that gentleman. We have been favoured with some new pictures, which are indeed a great step in advance of those which our readers have already seen.

A view from "Munich, Bavaria," is an exceedingly beautiful and elaborate picture, and one in which there is more half-tone than we have yet seen in any of Mr. Talbot's productions. A view of "Notre Dame, Paris," is remarkable for the softness which pervades the piece, and for the very delicate manner in which the shadows are rendered. There are a number of other pictures more or less different in character, but all bearing the decided mark of progress. An architectural view entitled "The Schools, Oxford" is even more beautiful than any of the preceding. In it there is absolutely all the half-tone which the most fastidious critic could desire. If we may judge of future success by the progress which has been accomplished with the last few pictures, we may with safety predict that Mr. Talbot will soon obtain by photoglyphy alone that which many think is only to be obtained by the help of the engraver. We are the more convinced of the truth of this from the fact, that we have now before us some of the specimens executed by Mr. Talbot in 1813, and the progress from that time to the present is indeed marvellous. Instead of the airy and sketchy pictures then produced, we have now almost perfect engravings.

Critical Notices.

Stereographic Pictures—English and Welsh Scenery. Illustrated by William Russell Sedgefield.

We have been favoured with some specimens of the above-named stereographic pictures, which we are happy to say cannot be concluded in the category of "Questionable Subjects." Photography—and especially stereographic photography—is here in its legitimate sphere, and in its proper application. The views are instructive and entertaining, while, at the same time, there are around them associations of a pleasant character. We scarcely know which to admire most, the landscapes or architectural pictures, because they are both the best in their respective departments. The care with which they are printed, the clearness of the negatives, the nicety of tint, the beauty of the half-tone, and the happy selection of sites, are all characteristics of these stereographs. "The Tubular and Suspension Bridges at Conway, from the Castle," is a most interesting view of this gigantic piece of engineering—one of the boasts of the nineteenth century—which is here given with a striking reality. "The Suspension Bridge" is rendered with all the delicacy of fine wire-work in this small picture, while the land beyond the bridges forms a good background. Glen Lledr, so well known through the large pictures of Mr. Fenton, is equally clearly given in the stereoscope. The boulders, which jut out in the bed of the river, are seen to great effect. "Pont Aberglaslyn, North Wales," is a charming little morçeau of scenery. The rendering of the foliage and the background scenery is extremely interesting; while, almost secluded, we catch a glimpse of the rustic bridge, which materially adds to the general effect. The indentations which floods have caused in the banks of the river are so regular, that they almost call to mind a theatrical scene from the Brush of Beverly. Of all the spots about Pont Aberglaslyn, the view selected by Mr. Sedgefield for this picture is, we think, the best. But the most wonderful of all the views is "The Summit of Snowdon"—not a view from the lowlands, when that king of mountains happens to be clear of the almost perpetual mist which envelopes him, but a view taken not far from the top—showing, in great reality, the dangerous height to which the photographer has attained. On the top we are enabled to see figures standing near the erection which crowns the summit of this lofty peak—the figures, no doubt, of some adventurous spirits who have accompanied Mr. Sedgefield on his photographic tour. This scene is, to us, a striking instance of the great applications to which photography may be put. The view is one of which almost everybody has heard, but which very few have ever seen, except in the fanciful sketches of tourists, or in the still more crude attempts of elementary geographic illustrations:

we have given our readers an opportunity, in the pages of the "PHOTOGRAPHIC NEWS," of seeing some of the difficulties attendant upon the photographer abroad, both in India and Algeria; but here we have some of the difficulties of our own land more forcibly depicted by the camera than they could be by the pen. The last landscape view that we will mention is of a place with which everybody who has ever had a drawing lesson will be acquainted. Who has not heard of the numberless prizes which have been gained for views of "Tintern Abbey," by all kinds of light, from early dawn to brilliant moonlight? The position from which this view is taken is from the Chapel Hill, so that the Abbey lies at the foot of the hill; and directly facing is another hill, which is covered with trees, the most remarkable feature of which is the nice gradation of tint which marks the distant perspective. The details of the Abbey are admirably given. Altogether the picture is an extremely pleasant one. Many of these scenes forcibly recall to our minds a series of admirable views which were taken in Ireland some time ago, and published by the London Stereoscopic Company. The architectural subjects are remarkable for the delicacy with which detail is rendered, the more so as all the views before us are interiors. Every photographer who has attempted in-door photography in any of our ecclesiastical buildings in this country knows, that the "dim religious light," about which poets sing, is anything but favourable to the photographic art, while the too glowing light is quite as objectionable. "The Interior of Exeter Cathedral, with the Minstrels' Gallery," is a nice picture; and the shadows, so difficult to catch in such a way as to balance the colour of the picture, are well given. The same remarks apply to the view of "The Transepts, Salisbury Cathedral;" while in this picture there is an absence of a defect which we have frequently seen in other views of transepts, viz., the strong light which shines in through the window, and causes an unpleasant glare to pervade the picture. "Bishop Fox's Chantry Chapel, Winchester Cathedral," is a carefully executed picture, and shows, with great minuteness, the elaborate architecture of this noble pile. "The Choir and Altar Screen, Winchester Cathedral," is about one of the finest. It strongly reminds one of David Roberts' delightful interiors; all that it lacks is colour, to make it a picture by Mr. Roberts.

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

Colouring the Hair, &c.—Where the colour of the hair is black or gray, the tone of the collodion positive is generally sufficiently near to that of nature, and may, therefore, be left untouched. In all varieties of brown hair, and especially flaxen, golden, auburn, or red hair, colour is absolutely necessary to correct portraiture. Dark brown hair may generally, with advantage, be left until the second colouring, as dark browns are amongst the colours which are generally removed by the application of varnish; but of that hereafter. All the varieties of light hair are, however, best coloured before varnishing. It is somewhat difficult to specify the tints to be used, as some modifications will be found necessary in almost every case. All the various tints of yellow and light brown, either alone or in combination, will at times be required, and in all cases much more intensity and brilliancy than appear natural must be obtained in the first colouring. One example will be sufficient to illustrate the principle on which this must be done. Suppose the picture in the hands of the colorist to be that of a lady with bright golden tresses: select a bright orange tint—the colour labelled "horizon" will answer best—and apply it to the *lights and half-tones only*, avoiding the deep shadows. This done, you will, if a tyro, be probably appalled by the most fiery-looking head of hair you have ever seen. Nevertheless, for the present leave it so; for after varnishing, this fiery hue will have softened into a sunny, but by no means glaring or unnatural, golden yellow. The same principle must be applied throughout in all varieties of light hair. For flaxen hair use a light yellow, either alone or in combination with "horizon." For light brown, use a suitable brown, either alone or in combination with "horizon." By applying the colour with excess of brilliancy at first, and allowing for the modification produced by varnishing, a much softer effect is produced, and one in which the characteristic texture, &c., of the hair is much better preserved, than if much were left to be done in the second colouring.

We have said that colour is to be applied to the lights and half-tones of the hair only, avoiding the deep shadows. All deep shadows should be transparent;* and in the hair especially, the peculiar form of the locks, the texture, &c., would be speedily lost if this point were neglected. In speaking of the deep shadows of a positive, we may as well here make a remark on the mode by which they are generally obtained in glass pictures. A coating of some black varnish is usually applied to the reverse side of the plate to produce the shadows. This is rarely the best method for coloured pictures. It is quite true that all shadow is a departure from colour, and, in uncoloured pictures, black is a very suitable shadow; but it has generally a cold, inharmonious effect in a coloured picture. We prefer, for this purpose, a backing of deep maroon velvet, which warms the shadows, and harmonises with the greatest number of tints used in portraiture, giving generally an especially suitable shadow-colour for the hair.

The Neck, Bosom, Hands, &c.—The neck, the bosom (if it be uncovered), and in most cases the hands, should be coloured with the No. 1 flesh. If a direct vertical light have been used in producing the picture, the heavy shadow of the chin often darkens the neck; this should, if possible, be avoided, as it is at once unpleasing and unnatural. The shadows of the neck and bosom should be cool, and the gradations as soft and delicate as possible; those of the hand and arm may be touched with carmine, with which the divisions of the fingers may be traced.

Draperies.—The mode of colouring draperies varies with the fabric; in good photographs they are often, especially dark draperies, best left uncoloured. The characteristic texture of most fabrics is generally rendered in photography with such beautiful exactness, that in many cases colouring can only mar them. In all cases where colouring is attempted, it is especially important to endeavour to preserve the peculiar texture, folds, &c. as rendered in the photograph. Here, as in the hair, the lights and half-tones only must be touched, avoiding the deep shadows. In colouring silks, the chief point is to keep the shadows clear and transparent, and the high lights brilliant, generally using for this purpose a tint a little lighter than the local colour. In light silk draperies a good effect is often produced by the use of two tints; in this case it must be remembered that where the lights are cool the shadows must be warm: thus, in a pale blue "shot" with orange, the lights will be blue and the shadows orange; in a green "shot" with any tint of red, the lights will be green and the shadows red; and so in similar cases. As a general principle in painting, especially in portraiture, the use of all positive colours should be avoided. The photographic colorist using powder colours is rarely in much danger of violating this rule, as the various half-tones of the photograph to which he applies the colour, have much the same effect, in modifying the brilliancy of his tints, as adding gray

* In the first article of this series, in enumerating the necessary characteristics of powder colours, we referred to their "transparency." This is a term possibly liable to some misconstruction, as entire transparency, in its absolute sense, is not possible in powder colours. We used the word in a modified sense, meaning that approximation to transparency resulting from the use of the purest and most transparent pigments reduced by careful levigation to the utmost degree of fineness. Colours so prepared are sufficiently transparent, when applied to the lights and half-tones of a picture, to tint without obscuring them; but if applied to the deepest shadows of the hair, &c., would assuredly detract from their clearness and depth.

to the colours of the painter. The young colorist will do well, however, to remember that masses of glaring colour have rarely a pleasing effect, and should be as much as possible avoided.

(*To be continued.*)

Photographic Chemistry.

ORGANIC CHEMISTRY.

UNDER the influence of the organs of vegetables and animals numerous compounds are formed, which chemists can analyse, change, and often reproduce in their laboratory. These substances are termed *organic compounds*. The etymology of this term, as is obvious, recalls that of *organised bodies*. We may add to these products a large number of others, which present much analogy to them, though not formed by organised bodies. Notwithstanding the numerous and diverse forms which vegetables present, and the still greater difference presented between them and animals, the elements of which both are composed do not exceed six in number—the difference between animal and vegetable substances being in the proportions in which these elements are combined. The elements in question are oxygen, hydrogen, nitrogen, carbon, phosphorus, and sulphur.

All organic compounds may be reduced to their elements by *destructive distillation*—that is, by exposing them to a high temperature in close vessels so as to collect their products. Thus:—If a man takes a gun-barrel, the touchhole of which is closed, and forces a piece of green wood to the bottom of the barrel, and thrusts that end horizontally into a good coal fire, water will soon begin to issue from the open end of the tube, which will be at first insipid, and then sour, and is, in fact, acetic acid. After this, gas begins to issue from the mouth of the barrel, which may be collected by tying a moist bladder, from which the air has been expelled, over the mouth. If a piece of tobacco-pipe be inserted in the neck of the bladder, and the gas issuing through it be set on fire, it will be found to burn with a white flame; and if burnt in a glass globe containing oxygen, a vapour will be seen to condense on the sides of the globe, and gradually trickle down in the form of water, thus proving that the gas in the bladder contained hydrogen. The gas which will be found in the globe will be changed into carbonic acid.

As we have already said, all organic compounds are destructible by heat, which may be made to reduce them to more simple combinations or to their elements—the regulated action of heat on some of them so modifies them as to produce new bodies. Thus:—If *gallic acid* be heated to a temperature of from 410 to 415 degrees, a new acid is volatilised, which is termed pyrogallic acid. This result is produced by the action of the heat on the gallic acid, leading to the loss of water, or carbonic acid (gallic acid $C_7 H_3 O_5$ heated, gives pyrogallic acid $C_6 H_3 O_3$ + 1 equivalent of carbonic acid, $C O_2$). The new bodies resulting from this species of action have received the denomination of *pyrogenous bodies*.

Organic products are solid, liquid, or gaseous. Some of them, such as acetic acid, gallic acid, sugar, and gum, are soluble in water; others, such as india-rubber, resins, and oils, are insoluble in water. Some of the bodies that are insoluble in water may be readily dissolved in alcohol, ether, different essences, &c., which are termed neutral solvents. The solid bodies of organic chemistry, like those of mineral chemistry, often assume a crystalline shape on being deposited in their solutions, or when they pass, in cooling, from a liquid to a solid state; of these are sugar-candy and stearic acid: others are amorphous—that is to say, are deposited without assuming any form; thus, gun-cotton dissolved in ether gives a homogeneous film, and, fortunately for photographers, does not exhibit the slightest appearance of crystallisation. (*To be continued.*)

Dictionary of Photography.

ACTINOMETER (*continued*).—Professor Draper has also suggested another means for measuring the chemical action of light, and one which will be found well adapted where extreme sensitiveness is not desired. It is by employing an aqueous solution of peroxalate of iron. This substance is of a golden yellow colour, and may be preserved unchanged for years if in total darkness, but on exposure to the light of a lamp, or to daylight, decomposition immediately takes place, and a lemon-yellow precipitate of protoxalate of iron falls down, with evolution of carbonic acid. The effect of sunlight upon this compound is so strong, that the liquid actually hisses with the rapidity of the escape of the gas. The chemical decomposition which takes place will be easily understood on reference to the following equation:—

$$Fe_2 O_3 . 3C_2 O_3 = 2 (Fe O. C_2 O_3) + 2 C O_2;$$

or, one equivalent of peroxalate of iron equals two equivalents of protoxalate of iron, and two equivalents of carbonic acid.

The rays which chiefly affect this solution are the most refrangible indigo and violet rays, the same, in fact, which affect the tithonometer and silver salts in general. In its application to photometry several plans may be pursued:—The quantity of the carbonic acid produced may be estimated either by determining its weight or volume; or a determination might be made of the weight of certain metals—gold or silver, for instance—which the solution after exposure would precipitate.

Several precautions must be borne in mind in experimenting with this body. First, the lemon-yellow protoxalate must not be permitted to incrust the sides of the glass exposed to the light, and thus injure its transparency. Second, the solution of peroxalate must be kept nearly at a constant temperature as its colour changes with the heat, it being at the freezing point emerald green, and at the boiling point brownish yellow. Third, before any carbonic acid can be disengaged, the solution must become saturated therewith; and, therefore, before the quantity of incident chemical rays can be correctly measured by the amount of disengaged carbonic acid, the portion dissolved must be removed either by exposing the solution to heat, or by passing a stream of hydrogen through it.

At the recent meeting of the British Association at Leeds, Mr. Fowler read a paper on a process for the estimation of actinism. He proposes for this purpose a mixture of aqueous solutions of oxalate of ammonia and perchloride of mercury. This when in the dark remains unchanged, but on exposure to light a precipitate of calomel takes place. The details of this process having recently appeared in our pages (p. 63), we will not further allude to it.

ACTINOLYTE.—A comprehensive term proposed by Dr. George Wilson, as applicable to substances on which light exerts a chemical and physical change. He says, in lecturing on the theory of photography: "I have found the word *Actinolyte* very convenient . . . . In its simplest etymological meaning, it signifies a chemical compound analysable into its components by light. I propose, however, to use it in as wide a sense as Faraday's term, "electrolyte" (from which it is borrowed), so as to include chemical synthesis as well as analysis; and in the present state of our knowledge it would be convenient to extend the term to all the substances employed by photographers on which light exerts a marked, sensible change, although it may be uncertain how far that change is chemical or mechanical."

ADHESION, ATTRACTION OF.—The power of attraction which exists between the particles of dissimilar kinds of matter; it gives rise to a variety of important phenomena, and is especially worthy of the attention of scientific photographers, as its powers are nearly allied to that of chemical affinity. A familiar illustration of this force is the adhesion of water to the surface of glass, which is thereby wetted.

The adhesion of the collodionised plate to the glass dipper also depends upon this force. All bodies exert the force of adhesion: between solids it gives rise to a resistance to motion which is known as *friction;* this is greater when exerted between similar kinds of matter, and less between dissimilar kinds. A common means of diminishing the amount of this force is by the interposition of a body whose particles have but little cohesion one with the other, such as plumbago or grease. India-rubber is a body whose great power of adhesion is constantly being made use of by the scientific experimentalist; its power of adhesion to glass is almost perfect, and it is thus commonly employed in the manufacture of plate holders.

(To be continued.)

A Catechism of Photography.

M. TILLARD'S PROCESS.

Q. What is the process adopted by M. Tillard?

A. M. Tillard's process bears some analogy to the preceding, and by means of it he has obtained very rapidly some very fine proofs.

Q. How is this process conducted?

A. Into about a quart of essence of common turpentine is placed the white wax, in small pieces, and without being melted. They are left to mix together two or three days, and the solution is then decanted and filtered. Into this filtered liquid a small quantity of iodine is then placed. The iodine is immediately dissolved, and a discoloration of the liquid takes place. If the discoloration is not complete, the solution should be exposed for some time to the sun.

Q. What is the next process?

A. A very small quantity of palm oil, perfectly pure, is added in the proportion of 40 or 50 drops to 100 cubic centimètres* of the liquid. The best method of ascertaining the proportion of oil is to test with a small piece of paper if the grease spot be stronger in one case than in the other. If this be the case no more oil need be added.

Q. How do you proceed?

A. The iodide bath, having been prepared and filtered, is placed in a dish or basin, and the paper is soaked in it until it is thoroughly penetrated. The paper is then dried rapidly, and laid aside for sensitising at another time.

Q. How is the paper rendered sensitive?

A. It is sensitised in a bath of nitrate of silver in the following proportions:—

Water	100 cubic centimètres.
Nitrate of silver	76 grains.
Nitrate of zinc	190 "
Acetic acid	190 "

The paper is washed and dried, as in other processes, and is then ready for use. It may be preserved as ordinary waxed paper.

Q. How is a picture taken by this process developed?

A. It is developed by immersion in a bath of gallic acid, in the proportions following:—

Distilled water	50 cubic centimètres.
Water saturated with gallic acid ...	50 " "
Acetic acid	190 grains.

to which is added a little of the solution of silver which has been used in the preceding process.

THE ENGLISH WET PAPER PROCESS.

Q. In the preceding processes wax has been stated to preserve for a considerable period the sensitiveness of photographic papers. Furnish some illustrations of the photographic process on paper wherein wax is not employed?

A. Under this head we have the following excellent plan adopted by several eminent photographers.

Q. What description of paper do they employ?

A. The paper employed is generally English.

* One cubic centimètre equals 0·001761 parts of a pint.

Q. What solutions are employed in the preparation of these papers?

A. Solution No. 1 is prepared as follows:—in 3 ounces of distilled water are dissolved 120 grains of nitrate of silver; in another glass capable of holding three ounces of water are dissolved 1,200 grains of iodide of potassium. Into this solution, by slow degrees, gently agitated with a glass rod, the solution of nitrate of silver is added. The iodide of silver is at first precipitated, and the solution next becomes perfectly clear and limpid.

Q. What other preparations are necessary?

A. Another bottle must contain the aceto-nitrate mixture according to the following proportions:—distilled water, 4 ounces; nitrate of silver, 198 grains; crystallised acetic acid, 400 grains. In another bottle must be a saturated solution of gallic acid; and in a fourth, 7 drachms of hyposulphite of soda in a quart of water. All these solutions—with the exception of the fourth, must be carefully filtered.

Q. How is the first solution to be employed in the preparation of the paper?

A. Having procured a board, perfectly plain, and of sufficient size for your purpose, cover it with blotting paper, upon which fasten, by the two corners, the paper you intend to prepare. With as much rapidity as possible apply the solution No. 1, taking great care that it is imbibed by the paper equally in all parts. When you are satisfied of this hang it up by one corner to dry, and remove any drops which may run down to the lower corner by lightly touching it with a small piece of blotting paper.

Q. When the paper is thoroughly dry, what is the next operation?

A. When dry the paper must be immersed for four-and-twenty hours in a basin of pure water; after which it must be dried between blotting paper, and is then ready for the second process.

Q. Is the paper so prepared insensible to the effects of light?

A. It is. The colour of the paper, if properly prepared, is of a pale yellow.

Q. What is the second process?

A. That by which the iodised paper is rendered sensitive. It may be conducted as in the preceding process, namely, by stretching the paper on a flat piece of board, or, what is better still, by the use of a bath of distilled water, to which has been added a few drops of solution No. 1 (aceto-nitrate), and a few drops of solution No. 2 (gallic acid). The prepared paper may be floated on the bath for not more than three minutes, care being taken to remove it immediately any stain appears on the bath. After removal it is dried between blotting paper, and may then be placed in the frame between two glasses. This paper will not keep for any length of time, certainly not more than four-and-twenty hours in warm weather, but in winter it will continue sensitive for four or five days.

(To be continued.)

Correspondence.

PAPER v. COLLODION.

Sir,—It is reported that Mr. W. L. Smith, at the recent meeting of the British Association, alluded to the waxed paper process as "now generally exploded." The term is a strong one, and perhaps owes its use to the prevalent furore for the more inflammable collodion; but let that pass. As an admirer and practitioner of this "exploded" process I cannot but feel sorry that it does not obtain more notice, and am fully convinced that excellence may be attained by its employment, as, in fact, it may by any process, if perseveringly studied and practised. Whenever the means of rendering paper equally sensitive with collodion (a discovery by no means improbable) shall be arrived at, I have no doubt that it will entirely supersede the latter, and justify

the opinion of French artists, that the future excellence of photography must be looked for in its employment. Until this is the case, the superiority of collodion for portraits, and for the introduction of moving objects, must be conceded; but I feel satisfied that for landscapes of every kind the waxed paper will produce results equally artistic, whilst for facility of manipulation, and for operations in the open air, there can be no question of its superiority. If every photographer would give us the statistics of his practice *out of doors*, and inform us the proportion that his failures bear to his successes, I have little doubt that the prevalent preference for collodion, with its cumbrous appurtenances, would be greatly diminished, and the far more simple and easy method meet with greater favour. The operator with waxed paper is not annoyed by such things as imperfectly cleaned glasses, separation of the picture from its support, blisters, fogging, or ill-behaving baths; to say nothing of the discomfort of working in a tent with the thermometer at fever heat. It is true that he has to spend more time in the exposure, but this enables him to feel more sure that the time so spent is correct; a minute more or less being of little consequence, whilst a second or two may spoil a picture on collodion. Nor is this all; his sensitive surfaces are easily prepared, and will remain so for several days if wished, which, when from home, is no small advantage, whilst the gradual development of his negatives enables him to procure any desired degree of intensity without the necessity of uninterrupted attention. If these remarks should induce any increased attention to this valuable process, and prevent its being altogether "exploded," it will gratify its admirer.

Croydon, December, 1858. ALIQUIS.

CARBON PRINTING.

DEAR SIR,—In your report of the meeting of the Manchester Photographic Society, I see that Mr. Mabley has hit upon a method of producing carbon prints with sulphuric acid. This plan, which I believe to be the most correct in theory, was first suggested by Mr. Johnstone, a very clever operator here, and communicated by me to the editor of one of your contemporaries six months ago; that gentleman has not yet published it, because he did not think it was practicable. An experiment will prove, however, the correctness of the theory, and show your correspondent where he has failed—by using the acid too strong Take a sheet of paper and coat it with a solution of sugar in gum; when dry, write upon it with a quill pen dipped in *dilute* sulphuric acid; dry, and then hold to the fire. The writing at once will become visible, by the separation of the carbon from the sugar. Carry out this experiment by introducing the bichromate of potash, and expose as a photograph. I believe that, with a little modification, this will prove a good method of printing in carbon.

Birmingham Photographic Society, W. OSBORN.
Dec. 15*th*, 1858.

PRECIPITATED CARBON FOR PRINTING.

DEAR SIR,—You will find in the report of the proceedings of the Manchester Photographic Society that I threw out some suggestions for a method of printing in carbon. I have not since then had the leisure to experiment further; but one thing arises from it which may, I think, certainly be of advantage, should this process be generally adopted, and which I also mentioned at the Society's meetings. I allude to the production of carbon by precipitation from saccharine and gummy solutions by sulphuric acid; in this state it is, of course, in a finer state of division than any mechanical process can attain.

Yours respectfully, WM. TUDOR MABLEY.

ILLUMINATED PAPER STEREOGRAMS.

SIR,—Can any of your correspondents inform a few country amateurs what is the *best* way to procure the semi-transparent or illuminated stereo. slides on *paper?*

P. H. O's.

Miscellaneous.

THE PHOTOGRAPHIC NEWS ALMANACK.

WE beg to call our readers' attention to the "PHOTOGRAPHIC NEWS ALMANACK for 1859," price 6d., free by post 7d., which was published with No. 14 of the "PHOTOGRAPHIC NEWS." The moderate charge which is made for this work is such as to bring it within the reach of everybody; and the same spirit which characterises the "PHOTOGRAPHIC NEWS," namely, the wish to disseminate useful and important information, alike to the practised operator and the amateur, characterises the "Almanack." It will be found to be of the greatest assistance not only to the private amateur, but also to the professional photographer; to the former, on account of the numerous hints it contains, which, if attended to, will ensure success under the most unfavourable circumstances; and to the latter, for the information on subjects which are so liable to escape the memory. Indeed, we can recommend it as one of the most useful works of reference that the photographer can by any possibility possess, and we flatter ourselves that no photographic library or studio will be thought complete without a copy of this Almanack. In the monthly calendar will be found the days of meeting of all the important Photographic Societies in the kingdom, making it a complete and useful guide to secretaries. The "working hours" for each month, together with valuable hints and suggestions to the beginner, and perhaps the small and unpretending, yet absolutely requisite, maxims at the foot of each page, will be found to be not the least important portion of the Almanack. The *resumé* of the various processes discovered in 1858 will be interesting to all. The list of picturesque spots suitable for photographic excursionists will, no doubt, be much read and consulted in August and September next; while those who are anxious for reliable information in regard to the chronological figures of the art, will have great assistance from the "chronology of photography," which has been compiled from the best and most reliable authorities. These are only a few of the leading features of the Almanack. There is, besides, a mass of miscellaneous information which cannot fail to prove of great interest to the non-photographic reader. We will say no more on the subject, but will leave our readers to judge for themselves of the merits of the "PHOTOGRAPHIC NEWS ALMANACK."

TRANSPARENT ENAMEL PHOTOGRAPHS.—We have recently had submitted for our inspection some specimens of a process patented by Mr. Glover, which possess peculiar features of novelty and beauty. The substance on which they are produced is a white enamel glass, upon which they are printed from glass negatives. They have the peculiarity of being positives by either reflected or transmitted light. As stereoscopic transparencies, they possess exquisite softness combined with great vigour, certainly surpassing transparencies produced by the ordinary process. As positives, they also show great delicacy of tone; the whites being, of course, the pure white enamel, and the shadows the rich purple tone produced by gold toning. An important part of the process appears to be the preparation of the enamel surface, which is slightly granulated or deadened by means of hydrofluoric acid. The effect of this is, that the subsequently applied film, whether of collodio-albumen, collodio-gelatine, or plain collodion, adheres with such tenacity, that washing even with soap and water fails to injure the finished picture. The specimens we have seen are by the collodio-albumen process, printed by superposition, and toned with gold; but there appears to be no reason why any other dry process might not be used, nor indeed why the ordinary wet collodion and camera printing should not be equally suitable. The process, as we have said, is patented; and for further particulars we refer the reader to our advertising pages.

WE have been favoured with an inspection of some glass positives taken by a process which the inventor has chosen, in the most glaring opposition to scientific nomenclature, to be entitled "Electro Enamelled Vitrotype Pictures." It is evidently a process of the alabastrine kind, in which perchloride of mercury plays an important part. The results, we must say, are far more pleasing to our eyes than the name is to our ears. There is a degree of softness about the pictures, which almost reminds one of the beautiful enamels of Essex.

Photographic Notes and Queries.

SPOTS ON COLLODION PLATES.

Sir,—If any of your readers have encountered half the annoyance I have met with from the matter to which I am about to refer, no apology will be required by them for my troubling you with this letter. I hope I may equally trust to your indulgence to admit it in the columns of your valuable publication, as a hint, though possibly worthless, sometimes broaches discussion which eventuates in the general benefit.

"Spots on collodion plates," is a heading so frequently met with in photographic periodicals, that it might safely be stereotyped, and yet, as far as my experience has gone, the hints for their remedy have not always been effectual. "The books" give several reasons for the intrusion of these unwelcome visitors. As far as I remember, they are attributed to—

The collodion being used too soon after mixing.
Impurities in the collodion.
Too long immersion in the bath.
Delay in exposure after sensitising.
Foreign matter accumulated in the bath.
A dirty plate.
Undissolved particles in the development.
Dust in the camera or operating room.

It would be almost presumptuous to add to the long catalogue; but after some experience, I would venture to add one other cause, and attribute them sometimes to the *direction of the light*.

I may be allowed to give my reasons for coming to this conclusion, especially since (as far as I am aware) I have not the advantage of scientific authority for my opinion. I have upon several occasions worked part of a day without any sign of the appearance of the spots; when suddenly, without any change in the manipulation, they have come upon me in clouds. I have then sought for a cause from the source I have referred to. I have changed all my materials; filtering, dusting, and taking every precaution suggested. Still they came; and I have put away my apparatus in despair. After awhile, it occurred to me that, having changed everything without effect, the evil was attributable to something I could *not* change. In short, I considered that the *varying light* had something to do with it. I had this idea from remembering that at a certain time of the day, when the sun was at a point nearly at right angles to my camera, the spots appeared. I thereupon considered that if the obliquity of the rays of light were the cause, shading the camera might have an effect. To do this I adopted a plan for which I am indebted to you (though for another object). I fixed a framework of wood upon the point of the camera, and over this I threw a black cloth, projecting about eighteen inches. This answered my hopes; for when I used it, *I had no spots;* on the contrary, when I removed it *the spots reappeared.*

But, the other day I was fairly puzzled. I was copying an engraving, and plate after plate was literally riddled. I was enabled to accommodate myself to the light, so changed my position to every point of the compass, but in vain. My "black cloth" was powerless. I returned to my old expedient, changing all my materials, one after the other, still without effect. Then it occurred to me that there was something the matter with the light, and I thought it possible that *the pins* with which the engraving was fastened might act as reflectors, the rays playing upon their polished surface, which diverted their direct action. I could not give any scientific reason for this notion; but, at any rate, I thought I would see if there were anything in it. I removed the pins, and fastened down the engraving with gum, looking with some little interest for the result. *My next plate had no spots;* and with the same materials and the same manipulation I have not had their company since.

I make no doubt I have thrown myself open to ridicule at the hands of your scientific readers. Probably "they never meet" with the annoyance I have referred to (a common answer to me when I have mentioned to my photographic friends any difficulty I have encountered). I am not ashamed to confess that I sometimes meet with *unaccountable* annoyances, and I do not hesitate to adopt the most out-of-the-way remedies when I do.

In reply to those who may laugh at my notion that the spots have not always a mechanical, but sometimes what the learned call an "actinic" origin, I would ask them, if I am wrong, what *is* the cause? I am emboldened in asking the question by remembering that in one of your recent numbers, no less an authority than yourself suggested that under one contingency (the formation of nitrate in the bath) nothing was left but to begin *de novo*. But I think you merely threw out the suggestion as the *possible* cause; but if it were not, what then?

However, I only write for information. I am, very likely, wrong. I hope some of your readers will put me right.

"Si quid novisti rectius istis,
Candidus imperti; si non, his utere mecum."

I am, Sir, your obedient servant,

3rd December, 1858. H. T. T.

DRY COLLODION.—SIMPLE LEVELLING STAND.

Sir,—In reply to E. P., I have used both the acids named, but have not found them of any service, consequently, I did not mention either as being required in developing.

I considered that all photographers knew that development would not take place with a washed collodion film unless nitrate of silver was added to the gallic acid. No doubt the best plan would have been to have been more explicit, but by describing the plan I pursue I shall make amends for the omission. Take 1 ounce of a saturated solution of gallic acid, and after first moistening the plate with distilled water, pour off and on, then place the plate on a level stand—pour on the gallic acid, let remain for 3 to 5 minutes (not particular), return to the developing glass or measure; add 4 drops of a 30-grain nitrate of silver solution, let it remain until the picture appears; again return the liquid to the measure, add 8 or 10 drops more of silver solution, pour off and on once or twice, let it remain until sufficiently intense, and wash gently; then clear off with cyanide of potassium, 5 grains to the ounce, and varnish. I consider gallic acid produces finer deposits of silver than pyrogallic acid, although the time occupied in development may be four or five times longer.

I never find a film given to rambling; it is true I do not wash off by means of a stream of water from a fire engine, nor do I pass my finger heavily over the film until it is varnished. Many seem to fancy that development by gallic acid takes such a long time, that it must of necessity be extremely troublesome. So it would be if we required to watch the development as with pyrogallic—but such is not the case. If I were asked to develop a number, say ten or twelve, I certainly should use gallic acid, as it is much less trouble—and the results are better.

Now, suppose I have returned with the above number of plates, I should go to my dark room, place the number of level stands requisite in a row, moisten the plates, pour off and on the gallic acid, add the 4 drops of nitrate of silver, and pour on to the plates; this would occupy about fifteen to twenty minutes. I next go to look after the other development, viz., of myself—that is one of very great importance; whilst so doing, at mine ease, half to three-quarters of an hour may elapse. I then return to the dark room, and find the picture well out, add the remainder of nitrate of silver, and find my way again to the sitting-room,—read, laugh, chat, or do just the same as the family are doing—merely slipping out once or twice to see how the plates are getting on, and when I find them intense enough, why then my friends will have to "wait a little longer" ere I return. I daresay many will think that to have a dozen level stands

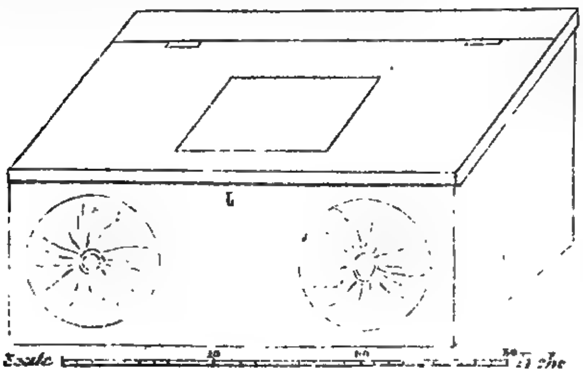
is rather expensive; if I used those usually sold for that purpose, it would be so, but I make a cheap substitute, as follows, at the cost of 2*d.* each:—Let some joiner cut out equilateral triangular pieces of wood, of 5 or 6 inches in the side, and ½ inch thick; make a hole at each corner; obtain some 2½ or 3-inch common screws, at 2*d.* or 3*d.* per dozen; take them to a smith, and have the heads flattened into thumb-bits; screw one into each corner, with plenty of grease, so as to work easily. Place a cup, glass, or any convenient piece of crockery on the stand, and adjust, &c., for developing.

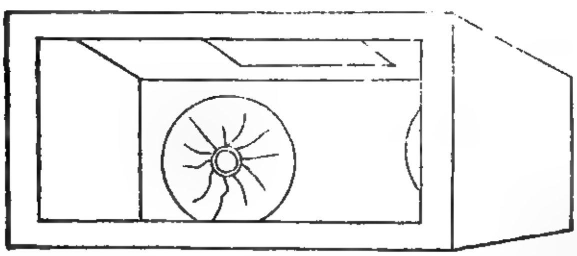
One of Devon.

PORTABLE DEVELOPING BOX.

Sir,—Having frequently had to pull down and rebuild my dark room, I have seen the necessity of a good portable one. I have tried many recommended by various books, &c., but not finding one very comfortable to work with, I was induced to call my inventive powers into play; my success has far surpassed my expectation, for I am now able to work anywhere.

Thinking it might be of use to some of your other subscribers, I have sent a short description of it.





The one I have is made of deal wood, painted inside yellow, the square hole in the top is glazed with orange glass, the round ones in front are covered with black silk sleeves, with a piece of elastic tape for the wrists, the sleeves should be sufficiently long to hang down over the holes. The back I have covered with three thicknesses of yellow calico; in the bottom I have a tin tray to catch slops, and at the back a small tin cistern, with stop-cock, for water.

The dimensions given I find very convenient for all the bottles and measures necessary for manipulation.

Stereogram.

GRADUATED BACKGROUNDS.

Sir,—I see a good deal about backgrounds with light centre. I would recommend the following:—Take unbleached calico, or other suitable substance, and stretch on a frame; take whitening, mix with size, and simmer over the fire; apply this to the centre of the stretched calico, or other material, with a large brush; this will give an intense white; soften this gradually into a dark blue, or some other colour that will give a medium tint. On proceeding to take a portrait (on a sun-shiny day), get some one to hold a large looking-glass so as to catch the sun's rays, and to reflect them back on the white part of the background behind the head of the sitter. The glass must be held somewhere behind the camera, sufficiently to the right or left, so that the reflected light do not come in contact with the sitter. The darker part of the background, on the side which the light from the glass passes, will be something lighter, but with a little judgment this can be turned to advantage. The looking-glass must be kept gently in motion; if a square one, move it in a circular direction. If this be nicely managed, a graduated light can be thrown in behind the head of the portrait—a light of any intensity, falling off in an imperceptible gradation, giving a fine artistic effect.—Truly yours,

R. W.

Croydon.

PRINTING FROM A CRACKED NEGATIVE.—TRANSFER VARNISH.

Sir,—In a recent number of the "Photographic News" your correspondent wants to know how to print without showing the crack. I have found the following perfectly successful when the negative is not broken in two parts:—carefully clean the varnished side, then pour over Archer's transferring varnish, dry by the fire, and put the negative in cold water; in a short time the film will float off the broken glass in the water; do not touch it with the warm fingers, as it is apt to contract slightly; take another plate of glass, the same size as the broken one, and put it in the water under the floating film, gradually raise the plate to the surface, and the negative on it; let it drain; put it in a pressure frame with a few folds of blotting paper, to press out any remaining water, and the negative will be as perfect as before broken if nicely done. We have several that have been constantly printed for four years past. Archer's transfer varnish is made by dissolving some pure gutta percha in benzole; it must be made rather thick, and should be applied to a warmed negative instead of warming the solution as before recommended, as the latter method renders the varnish useless after a few applications. If you think the above worth a place in your valuable journal, my brother photographers are welcome to what has been of great value to me.—Yours truly,

H. D. Francis.

THE INK PROCESS.

Sir,—In vol. i. p. 155 of your valuable journal, is a letter from Mr. M'Craw respecting the Ink Process of Mr. Perry, at the conclusion of which he asks the question whether there are any patents affecting this process. In reply, allow me to inform him that Mr. Perry's patent *now in force* was taken out early in 1856, and that under its protection I took some hundreds of pictures, at least twelve months before M. Sella made any communication on the subject.

The specification of the patent in question was published in a contemporary—I think, some fifteen or sixteen months since, the same journal, in fact, in which I claimed the discovery on behalf of Mr. Perry, and therefore I am surprised it should have escaped Mr. M'Craw's observation.—I am, sir, your most obedient servant,

J. Sharp.

28, *Old Bond-street.*

VARNISH FOR NEGATIVES.

Sir,—As I see a good hard varnish is much required, I think the following would answer very well:—

Alcohol	2 ounces.
Copal	½ drachm.
Camphor	20 grains.
Mastic	15 grains.

The copal, finely pounded, should be added to the alcohol, with the camphor and mastic previously dissolved; let it remain three days in a warm place, shaking occasionally. It requires the plate to be warmed, and dries so hard that the finger-nail scarcely marks it.

H. C. J.

[We thank our correspondent for the prints, and shall be glad of further particulars.]

ANSWERS TO MINOR QUERIES.

TESTING A LENS FOR SPHERICAL ABERRATION.—*An Optician.* Point the camera at a very small, bright object, such as the image of the sun reflected from a convex glass surface, and get it into proper focus. Now move the lens to and fro in order to throw the visual image on the ground glass alternately within and without the focus; the bright point will expand into a luminous disc, and if it shows a firmer margin *within* than at an equal distance *without* the focus, it is under corrected for spherical aberration, and slightly over corrected for colour, as all photographic lenses should be. If any colour be visible, it should be merely a slight fringe of blue within the focus, or red without.

THE ALABASTRINE PROCESS.—*W. Keith.* Our correspondent has drawn our attention to the following formula for the above process recently communicated by "J. B. R." to another journal:—Take a picture in the usual way, and after fixing, lay it in a dish containing hot water, and let it remain there about three minutes; then take it out, and wash with cold water, drain a short time, and place on a levelling stand; now pour on the re-developing solution, composed of—

Distilled water	1 ounce.
Saturated solution of perchloride of mercury in hydrochloric acid.	12 minims.
Protosulphate of iron	20 grains.
Nitrate of potassa	12 ,,
Alcohol	½ drachm

On the first application of the solution the picture will almost disappear, and then gradually become more and more developed. Let it remain in this position until you have gained the desired effect, which will take from twenty to thirty minutes; then wash thoroughly with water, and dry by the fire. Our correspondent has sent us a very beautiful specimen of his success with this process, and, we must say, it equals anything we have ever seen of the kind. He advises not to use a spirit varnish, as that turns the picture into slate colour. Amber and chloroform varnish answers admirably. The picture must not be backed up with black varnish, but black velvet, or another glass blackened. Our correspondent also states, that he has found an advantage in dissolving the perchloride of mercury in a solution of chloride of ammonium instead of hydrochloric acid, as the film is not so likely to peel off.

THICKENING POSITIVES WITH CHLORIDE OF MERCURY.—*A Learner.* The plan which you ask for is one which was recommended some years ago by Mr. Maxwell Lyte. He proposed to pour over the picture a mixture of one part of a saturated solution of perchloride of mercury in hydrochloric acid, and six of water. Allow it to remain until whitened, and then wash well, and pour over the plate a solution of iodide of potassium, about 2 grains to the ounce. By this means a dense yellow negative is produced.

YELLOW BOTTLES.—*H. M. T.* Several of the chemicals used in photography should be kept away from the light. We had bottles made some years ago which were flashed with a dark orange colour, and in these the silver bath, collodion, acetonitrate of silver, &c., were kept. They have since given us every satisfaction, and we can recommend them to our readers. At that time the bottles had to be made on purpose; but at present there is hardly a photographic warehouse of any note in which they are not kept. Of course our readers will be well aware that the dark purple bottles in which druggists are in the habit of keeping substances on which light exerts a deleterious action, are worse than useless, as they are apt to mislead. *Light* alone is obstructed, whilst the actinic rays pass freely through.

TO CORRESPONDENTS.

OUR correspondents will find it advantageous to sign with the initials only. Letters from "A Correspondent," "A Subscriber," "A Novice," &c. &c., are so frequent, that difficulties may arise in identifying the proper answers.

F. Y.—We hope to be able, in an early number, to lay before our readers some important particulars on the point to which our correspondent alludes.

A NEW SUBSCRIBER.—The objection to single lenses for photographic purposes is, their comparative slowness. We have, however, taken excellent portraits in the summer in a few seconds, by means of a single lens 3½-inches in focus, and ¾ in diameter, with a ¼-inch stop in front. Your other query has recently been answered.

R. W. F.—We prefer stereoscopic transparencies taken on the ground side of the glass plate. No change should take place for a minute or two when the developing and silver solutions are mixed, if they are made with pure chemicals, and mixed in a perfectly clean vessel, and kept in the dark. Try the collodio-albumen process.

SUBSCRIBER AND AMATEUR.—We have the article ready, but want of space has compelled us to defer its publication for the present number.

X. Y. Z.—We cannot recommend any particular make of collodion. Consult our advertising pages, where announcements of some of the best collodions we have ever used are to be found. To speak more definitely than this would be unfair to other makers.

H. M.—Add a few drops of glacial acetic acid; that will most likely remedy the fault.

H.—We have delayed answering your letter of inquiries in the hopes of obtaining some important information on the subject. This we hope to give shortly.

A CONSTANT READER.—A double convex achromatic lens of 2½-inches diameter and 12 inches focus will not properly cover a field more than 8 inches square. To cover 12 inches square it should be 18 inches focus, and 3½ in diameter.

A TYRO, BRISTOL.—The reason of the present slowness is on account of the light not being so good as in the summer; and, also, because your rooms are too cold and damp. The term *film* is applied to the layer of collodion which is on the glass; it is used indiscriminately whether before or after immersion in the bath, or after fixing. Do not pour the developing solution so much on one spot; let it gently flow over the plate with a wave-like motion. Your former letter did not reach us.

ASMODEUS.—15 grains of iodide of potassium to the whole quantity. The fault of bronze-like markings does not seem to be confined to any particular make of paper. We hardly understand your last question.

P. S.—1. More applicable to positives. 2. Gelatine, 128 grains; distilled water, 14 ounces; absolute alcohol, 2 ounces, made sufficiently hot to keep liquid.

F. VINCENT.—1. Very difficult, as there is a great tendency to fog. 2. If you do not object to the reddish colour, the toning bath may be dispensed with. 3. Try a 50 grain bath, and have it slightly warm.

A NOVICE.—1. A twin lens stereoscopic camera has the advantage of taking the two pictures simultaneously. 2. We cannot give you more information than can be found in our back numbers.

W. E., EDINBURGH.—1. Instantaneous photography depends more on the light and lens than upon the collodion. 2. We intend to have as perfect an index to each volume of the "PHOTOGRAPHIC NEWS" as possible.

REUBEN.—Try the printing process given in vol. i. p. 86; and the notes on it at vol. i. p. 143.

P. J., AND G. A. S.—We do not know whether the patent for the photogen is merely for the lantern, or for the composition, or for the process of taking portraits by it at night. And therefore we cannot say whether it would be an infringement if you were to use any of the compositions we have previously given, in a lantern of your own contriving. Perhaps some correspondent will favour us with information on this point.

J. L. F.—1. Several weeks if kept from a strong light. 2. About an hour: the length of time the bath will keep depends upon how hard you work it. Some operators make a fresh bath every day, others use one for some weeks. The quantity given will serve for about 30 prints 8 × 10. The print received is very good, and speaks well for future success. A trifle longer stay in the gold bath would have removed the reddish tinge. 3. We do not think the prints need be printed so very much deeper than the desired colour; but experience will tell you better than we can. 4. It is not so manageable. The gold does not last so long, and the prints are very liable to fade.

J. L.—We shall be very pleased to see a description of your portable tent if you will favour us with it.

J. F. WILSON.—We are much obliged for your formula for the varnish. Will you kindly favour us with the address of the house where the article mentioned may be obtained?

ALB. COL.—See paper in the present number.

DUN. EDIN.—We will endeavour to remedy such an inconvenience occurring again; now, however, we cannot do anything.

E. M.—1. See answer above. 2. Yes. Peroxide of iron is the same thing as rust of iron.

L. L.—Add more nitrate of silver to the bath.

TETRATHIONIC.—Try the alabastrine process.

A NOVICE.—1. The recovery of silver from an old bath and its subsequent conversion into nitrate, are not easy of performance by persons unaccustomed to chemical operations. To such we should recommend the plan of selling the reduced metallic silver and purchasing fresh nitrate. The loss of tradesman's profit will be less than the loss of manipulation. 2. Hang three or four penny-pieces in a jug of the solution by means of copper wire. It need not be done in the dark. See our directions at p. 86.

A NOVICE AND SUBSCRIBER.—Your glass-room has too much wood about the sides and roof; it is, in fact, only a wooden room with a large window. Try a southern aspect in your particular case.

OLD HYPO.—We are much obliged for having our attention called to the subject; it shall be attended to. Add sheets of clean metallic zinc to the old hypo. bath, it will precipitate the silver.

J. D.—See the remarks on the subject in this number.

S. D. S.—See answer to Lerebour, p. 168. To take landscapes with a portrait lens, put a small stop in front of the front glass. It will not do so well, however, as a single lens.

H. S. L.—Your ideas are excellent, and we shall have great pleasure in giving them the publicity of our columns. They will prove invaluable to amateurs. They, however, arrived too late for the present number.

A SUBSCRIBER.—We have attended to the agency matter, and shall be very pleased to forward the views of your society in any way in our power. Will you send us the name of the secretary.

Communications declined with thanks:—C. S. W.—J. S.—T. P.—T. B.—Anticritic.—Frank.—W. X.—St. J.—A Subscriber.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—J. C. O. W.—W. P. W.—R. C. J.—J. W.—L. F.—Mg. O. NO_5.—J. Morel.—A. T.—Nitrate.—Roscoe.—J. T. S.—Amateur.—A Subscriber.—Novice.—X. Y. Z.—J. J. J.—James.—F. W. W.—Tyro.—No. 10.

IN TYPE:—J. T.—T. Barrett.—An Amateur.—A. Horan.—X.—H.H.J.—S.F.B.—J. C. S.—C. F. B.—A Foreigner.—W. H. W.—H. T. T.—Viator.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

# THE PHOTOGRAPHIC NEWS.

Vol. I., No. 16.—*December* 24, 1858.

THE COMMERCIAL USES OF PHOTOGRAPHY.

While every day brings forth an alteration, and every now and then an improvement, in the various photographic processes, and photography, artistically viewed, is continually approaching perfection, it is somewhat surprising to notice the neglect with which that portion of the art, which may ultimately turn out to be really the most useful part of it, has been treated.

We now and then hear of a photographic copy having been made of a bank note, by way of curiosity, or a fac-simile taken of some ancient manuscript or some such object; even of a photographic copy of a deed having been accepted in court of law as legal evidence; but the only step hitherto made towards applying the art to the general purposes of everyday life appears to be the reduction in size, by photography, of large maps to a smaller scale.

It is, perhaps, somewhat unfortunate that the first commercial application of the art should have been this, as an obvious objection presents itself on the surface; namely—that in reducing the size of an ordinary printed map, we reduce the size of the lettering also; so that to make a map, containing the required fulness of detail, of a portable size, the names of the various places must be so far diminished in magnitude, as to cause the searcher after the required city or mountain to inquire with Pope, "Why has not man a microscopic eye?"

This objection, however, is not insuperable. Should it ever become, and there is no good reason to the contrary, a general practice to publish reduced portable maps, of such a size that an ordinary pocket volume may contain an atlas of sufficient fulness, why should not a magnifying glass of adequate power accompany each volume, and form, in fact, an essential part of it? The two together can be made so as to be quite portable. Every wearer of spectacles does in fact carry a magnifier to enable him to read that which without it would be unreadable; and why should we not *magnify the spectacles?*

But, passing by this, which is only one end to which photography may be applied, let us turn our attention to the more ordinary things of daily use. In many businesses it is very desirable to have accurate patterns of the articles dealt in. To have these patterns engraved and printed would amount in some cases, where the article is low priced, and intricate in design, to more money than it would be worth while to expend. Take, for example, designs in lace, embroidery, and similar things. Intricacy in pattern is no greater difficulty to the photographer than simplicity, and dealers in this description of goods might find it answer their purpose to prepare illustrated catalogues of their patterns for transmission to customers.

Gentlemen in the country could select for themselves, as easily as they could examine a book, the kind of piano-forte or side-board they require from their musical instrument makers or upholsterers.

The utility of such catalogues to exporters to the Colonies or foreign countries, is obvious at once; in fact, the above propositions have already been adopted in the case of agricultural implements by some of the most eminent manufacturers of those articles.

In taking the outlines of coasts, the bearings and distances of land-marks necessary to be observed in entering harbours, representations of the form of lighthouses, beacons, &c., photography may be made a readily available means of contributing to the safety of life and property where shipping is concerned.

To the architect and railway engineer, an easy and accurate mode of information as to the progress of his works is here given him.

The merit of first employing photography for this purpose is believed to be due to the late Emperor Nicholas of Russia, who by this means got his information of the progress of the bridge of Kiew.

On the occasion of a late accidental fall of some portion of the works on a railway in progress of construction, the contractor, who was obliged to set to work at once to repair the damage, took the precaution, before he commenced operations, of having photographic representations of the state of the ruins taken. In the law-suit, which in all probability will result, what other evidence will supply the place of these truthful representations? How much clearer will the matter be made to the jury by the inspection of these infallible records of the actual appearance of the damaged works, than by the contradictory evidence of a dozen persons, all of whom most likely have a bias one way or the other.

Useful, however, as these applications may be, they are limited compared with the wider field presented to us when we descend to humbler pursuits. In the conduct of ordinary business, all the writing and book-keeping required therein conduces nothing to profit; in fact, is in itself as much a loss as the friction which cannot be got rid of in the working of machinery, but which absorbs and wastes so much of the actual motive power.

Cannot something, then, be done by this art to lighten the labours of the merchants', tradesmen's, and bankers' clerks? Why might not accounts current and similar documents be copied photographically? Why should not the merchant, who sends out his duplicate letters, invoices, &c., &c., by different ships, copy the original by photographic means, and make the sun do for him, with unfailing accuracy, that which at present has to be done either at the expense of much clerk's time, with risk of error, or by the very inferior means, compared to photography, of the copying press, which cannot be applied to anything but unbound and loose sheets? Wills, settlements, deeds, conveyances, and other important legal documents, ought always to have photographic fac-similes taken; reduced, if wished, to a microscopic minuteness, and duplicate copies printed and lodged in separate places of safeguard, to mitigate, in some degree, the serious inconveniences and loss which would be occasioned by a destruction, by fire or otherwise, of the original document. It is needless to multiply examples as to the kind of documents to be copied. The advantages of a method, accurate as the copying press, and as legible as ordinary writing, must be obvious to every one.

Might it not also be satisfactory, in these days of "cooked accounts," to shareholders and others, to have placed in their hands, not merely a printed copy of balance sheets, &c., but their *fixed shadow*, with the auditors' signatures, just as they stand in the original document itself?

And supposing, as we have no hesitation in saying will soon be the case, that these copies can, when a number is required, be produced with almost equal cheapness to a printed or lithographed copy, will not they be so infinitely superior in every other respect as to admit of no comparison as to their desirability?

They can, by Mr. Talbot's recent discovery, be even taken direct on to a copper or steel plate, and from that printed in the ordinary press, removing thereby any objection on the score of slowness of production.

No doubt objections can be made to these propositions; but objections have invariably been made to any improvement. When the electric telegraph was first introduced, few people believed that it would become so generally useful as it has since been; and when once public attention is fairly fixed upon the ordinary commercial uses of photography, there can be little doubt but that that art can be made as beneficial to persons engaged in business, as electricity has now proved itself to be. Very shortly after the first electric telegraph was brought into operation, a gentleman of our acquaintance proposed to a leading joint stock bank in London, having branches, where he was then employed, to connect those branches with the head office by means of telegraphic wires. He was, of course, laughed at as a visionary; but a firm, who do not bear, in commercial circles, the character of visionaries, have since found it expedient to connect their two establishments at opposite ends of the town by means of over-house wires, and, according to their own report, have found their account in doing so.

In the same way, it may appear to many commercial men useless or impracticable to operate in the way proposed with accounts and documents with which they are daily concerned. If the foregoing propositions prove to be of a useless or impracticable character, they will never be carried out; but if not, an impulse will be given to photography, and an extended field to those engaged in its practices, which cannot fail to be beneficial alike to them, and to every person engaged in commercial pursuits, throughout the whole of the civilised world.

DRY COLLODION PROCESS ON PAPER.

BY M. CORBIN.

[The following paper was communicated by M. Corbin to the French Photographic Society, and a committee appointed, consisting of MM. Bayard, Alfred Coulon, Paul Gaillard, and Gabriel de Rumine, to inquire into its merits. It was ordered to be published in the bulletin of the Society.—Ed.]

Last year I made known the results of my experiments with dry collodionised paper. I stated, that to obtain collodionised paper, giving proofs as pure as the collodion on glass, it was necessary so to operate that the collodion should form a completely independent film—the paper simply serving as a base of support, the collodion alone containing the image. I added, that a dry collodionised paper, fulfilling these conditions, might be obtained in the following manner:—

Iodised collodion is poured on a glass plate; then nitrated, and deprived of its sensibility by washing with the iodide of potassium; it is then transferred to gelatinised paper; and finally covered with a preservative film, and suspended until dry. The paper might be preserved indefinitely. It was sensitised at the moment of using it or some days previously.

I saw that the nature of the preservative film was of great importance to the success of the process. I made my first essays with gelatine. I poured on the paper, covered with collodion, a dry solution of gelatine, and left it to dry. To use the paper, I laid it on a very weak nitrate of silver bath (2 to 3 parts of nitrate to 1000 of water); I washed it, applied it on a glass, and exposed it, wet as it was, in the camera; I developed with gallic acid strengthened with aceto-nitrate of silver. I obtained, in this way, sufficiently good results, but, on the other hand, I met with many failures. The quantity of gelatine which remains on the surface of the collodion has a great influence on the proof. Now, this quantity depends on the greater or less rapidity with which the gelatine film solidifies, and in consequence on the exterior temperature. From this especially arises the inconstancy of the results. Beyond this, it often happens, that the collodion is penetrated by the gelatine in an uneven manner, which occasions spots in the proofs.

I have attempted to employ my sensitised paper in a dry state—that is to say, to suffer it to dry after being sensitised, and, in this condition, to expose it in the camera; but the proofs obtained in this way were very feeble on development, and the whites rapidly disappeared.

I then employed albumen, in lieu of gelatine, in the same manner. The sheet being dry, I sensitised it; washed, and exposed it in a humid state in the camera. The proofs I obtained on developing were gray in colour, and without vigour, and the whites faded away. In a dry state I obtained even worse results.

Why does the albumenised collodion process, which succeeds so well on glass, not answer when the collodion rests on paper? This fact arises from different causes. The paper, being permeable, absorbs a portion of the albumen, and an insufficient quantity remains between the particles of collodion to preserve their photogenic properties. Besides, it is easy to conceive, that the collodion lying on paper may, in drying, undergo a diminution of temperature, and the consequent contraction be greater than if it dried on the glass on which it was poured; it participates also in the contraction of the paper. Now, it is precisely this contraction which collodion undergoes in drying which deprives it of its photogenic properties, and which it is sought to obviate by interposing albumen between its particles.

I mixed a volume of honey syrup with the albumen, and the inconveniences enumerated above disappeared. The albumen, brought by this means to a syrup-like consistency, was no longer so easily absorbed by the paper; and, in consequence also of its possessing less fluidity, a larger proportion remained on the surface of the collodion; also, the honey prevented the complete desiccation of the paper: although it did not prevent it from becoming dry enough to be placed in a portfolio, and to undergo the unavoidable friction without alteration; still it preserved a certain humidity, which much diminished the contraction of the collodion. Finally, in consequence of the solubility of the honey, the sensitising liquid penetrates more easily in the collodion.

A paper thus prepared yielded very fine proofs, on the condition of not allowing it to dry between the sensitising and the development. If it were employed in a dry state, it gave only proofs which were gray and without vigour. . . . . I tried to modify this process so as to allow of the paper being used in a dry state. I covered the paper, which I had prepared with the honey and albumen mixture, with a second preservative film, in this wise:—I allowed it to dry, and then laid it on a gelatine bath, and dried it anew. In this way I obtained a paper which could be very well employed in a dry state, and which yielded me a certain number of fine proofs: but this gelatinising complicated the process, and the gelatine film, which ought to be very thick, is difficult to apply, so that I was under the necessity of seeking a method of simplifying it. The attempt to replace this film of gelatine by albumen was a failure.

After numerous essays, I found a process entirely satisfactory, dependent on the preparation of a new collodion. I remarked, that the old red collodions, containing free iodine—gave, when used in the albumenised collodion process, more vigorous proofs than those which a new and colourless collodion would have given under the same circumstances. Starting from that, I prepared a collodion in which I substituted for the iodides hitherto placed in them pure iodine, and I prepared with this collodion a dry collodionised paper with the honey and albumen preservative film, following the method already pointed out.

By employing this paper in a humid state, I procured proofs much more striking in their contrasts of the blacks and whites than those I obtained with a pose of equal length with the first paper: and in employing it in a dry state, the proofs which, with the first paper, were wanting

in vigour, were found, after a feeble pose, very fine and harmonious; the whites preserved themselves perfectly during the whole process of developing.

Such is the process which I have employed, with unvarying success, for a year past. I have not been able to find any preservative liquid which gave me better results than the mixture of honey and albumen. The albumen employed alone gives, even with the iodised collodion, only pale proofs, developing themselves with difficulty. I saw that other syrups, less clear, might be substituted for the honey syrup—such as those of sugar and glucose. I have used the latter, which is cheaper.

Other substances may certainly be substituted for the albumen, such as gelatine, caseine, &c. mixed with syrups or otherwise; but it will probably be found that no advantage will arise from their use, which will likewise be less easy than albumen.

(To be continued.)

THE MOLECULAR ACTION OF CRYSTALLINE PARTICLES.

BY DR. A. WELLER.

When a piece of glass is covered with a solution containing the double phosphate of ammonia and magnesia, and traces are made upon it by any hard body, it is known that they become visible shortly afterwards by the salt being precipitated upon them. Berzelius, who mentions this test in his Elements of Chemistry, states that Wollaston proposed to make use of this fact as a test of the presence of magnesia in solution, which has since been frequently adopted. According to Berzelius, the cause of this property is of a mechanical nature, probably from the glass being covered with microscopic crystals, the facets of which take a different position on the traces for some reason which is not easily explained. More recently, Professor Liebig has alluded to this subject in his Vegetable Physiology. These effects are referred by him to a state of unstable equilibrium of the various particles which compose the liquid, which is destroyed whenever a dynamical action is created sufficiently powerful to overcome the feeble attractions, or the inertia of the molecules in solution. He ascribes to the same cause the sudden solidification, upon being agitated, of water which has remained liquid when below the freezing point; the precipitation of a mixture of potash and tartaric acid; also the detonation of fulminating powder from the contact of any solid body.

Neither of these eminent observers mentions having submitted these traces to microscopic observation, although that is the only manner to test the hypothesis advanced by Berzelius. On the present occasion, it is my intention to describe some observations I have made, in order to elucidate the influence of molecular action on the precipitation of saline bodies, similar to that observed in the double phosphate; and to show that a similar influence is exerted over bodies in a gaseous state, and in a state of vapour; and afterwards to point out some phenomena hitherto unexplained, such as the fixation of the mercurial vapours in the daguerreotype, for instance, which evidently depends upon a like cause. In order to obtain the double phosphate, I have generally used a solution containing about ten grains of phosphate of soda, with about three of carbonate of ammonia, in an ounce and a half of water. I have preferred this mixture because the ingredients are more easily procured, and are less acted upon by the atmosphere than the phosphate of ammonia. The magnesia solution was generally a few grains of sulphate of magnesia to the same quantity of water as above. A small quantity of the first mixture is poured on a piece of glass, and to this are added a few drops of the magnesia in solution; if it be allowed to remain undisturbed, in a few minutes the surface of the liquid becomes covered with a thin film, and on the glass appear minute shining crystals, but if, before those crystals have time to form, any solid substance, as a glass-rod or an empty pen, for instance, is passed over the glass through the liquid, the course it follows becomes visible shortly afterwards. The images which are thus formed are double, and may be termed the upper and lower images. I will first describe the upper images. They appear on the surface of the liquid itself, when the film would otherwise have been formed. They are seen immediately after the passage of the pen through the liquid, whereas the lower ones only become apparent a few moments after. Being formed on a moveable surface, they are not perfect representations of the traces that have been made, and are changed and distorted by any movement of the liquid. When the solution of salt is weak they frequently disappear in a few moments after their formation, and are re-dissolved in the liquid; when the liquid is more concentrated, they likewise disappear, owing to the formation of the film on the surface. The production of these images appears to be independent of the chemical nature of the body used for tracing. They may be obtained independently of the lower ones, by drawing a thread gently over the surface of the liquid, without its coming in contact with the surface of the glass. The lower images are formed on the surface of the glass, under the upper ones. A few seconds after the tracing has been made upon the glass, they begin to appear, and gradually become more distinct. The space of time which elapses before their appearance depends upon the strength of the solution. When it is strong they appear quickly, and when weak they take several minutes before they are visible. To cause the formation of any images, the tracing must always be made after the mixture of the two solutions; under no other circumstances have I been able to create them. Thus, when the tracing is made on a perfectly dry glass, or on one slightly wet, and then immediately covered with the solution, no image will be created. This is likewise the case when we make traces in either the magnesian or the phosphate solution before their mixture together. The passage of any solid substance in the proper solution, on glass, will cause the formation of a deposit. Wood, glass, slate, and other similar substances, all have equal power in this respect, but metallic substances are less active.

(To be continued.)

ON CASEINE FOR PHOTOGRAPHIC PURPOSES.

BY P. C. DUCHOCHOIS.

To prepare soluble caseine, add about 15 drops of pure sulphuric acid (diluted in one ounce of water) to a quart of skimmed milk; let it stand ten or twelve hours. Collect on a filter the precipitate, which is coagulated caseine; wash it three or four times with pure water, and mix it with newly-precipitated carbonate of baryta; the acid will soon be saturated, and the caseine dissolve in water; then filter the solution, and evaporate carefully to the consistence of syrup (or to dryness, if you want to keep it), at a low temperature.

The caseine possesses all the chemical properties of albumen, and is isomeric with it.

As a substitute for albumen, in photographic preparations, I have found the following advantages:—

1. It does not desiccate so completely as albumen; is consequently less liable to scale, or to split, and can support a larger proportion of iodide without fear of crystallisation.

2. It coagulates less strongly, and gives a film less tenacious, and more porous; hence, proofs are more harmonious, and preparations much more sensitive than those of albumen. They are not, however, as rapid as collodion; but, by adding to the caseine some of those substances which give more sensitiveness to albumen (honey or soluble starch), I have obtained a good negative (in operating with the dry film) in 75 seconds, the collodion requiring one minute.

3. It is excessively fluid, easily filtered, and always free from those mucous threads which form in albumen.

It is also a very good varnish for collodion negatives, and can be used to prepare positive paper. Until now I have not been able to coagulate evenly the caseine on glass, having

obtained every time a film full of marbling lines, like those which take place on a collodion film sensitised with a too weak silver bath, or which does not contain enough pyroxyline. I think to overcome soon that difficulty.

By uniting caseine with albumen, I have obtained perfect proofs as harmonious as those on collodion, and in a time of exposure twice more rapid than on albumen.

The formulæ were—

A.

	Solution of caseine, as thick as albumen	3 fluid ounces.
	Albumen (from ducks' eggs)	2 do. do.
Solution of	Pure water	4 drachms.
	Crystallised honey	50 grains.
	Soluble starch	15 do.
	Iodide of ammonium	40 do.
	Bromide of ammonium	10 do.
	Tincture of iodine (new)	5 drops.

B.

Rain water	4 fluid ounces.
Nitrate of silver (crystallised)	125 grains.
Nitrate of zinc (fused)	70 do.
Acetic acid	1½ fluid drhm.

C.

Rain water	1 quart.
Acetic acid	1½ fluid drhm.
Gallic acid	70 grains.
Pyrogallic acid	15 grains.

Solution of nitrate of silver, at 4 per cent., in water, added to the developer in very small quantities when required.

The operations were conducted in the same way as for albumen.

In the collodio-albumen process of M. Taupenot, the above formulæ are the best I ever found for sensitiveness of the preparation, cleanliness and beauty of the proofs, never causing any blistering or rising of the film. The process is therefore a sure one, provided the collodion is not very tenacious and contractible. I do not hesitate to recommend it in preference to any other. The caseine can also be employed *alone* for dry collodion: here, again, it is very superior to albumen, gelatine, or meta-gelatine. The caseine solution must be very fluid, so as to filter easily through paper. The *modus operandi* is absolutely the same as for those processes:—Wash the sensitised collodion film; let drain a few seconds; pour upon it the caseine; let dry; expose; develop.

The preparation of pure dry soluble caseine is not very easy for those not well acquainted with chemical preparations; but I believe it will hereafter be found in any place where photographic chemicals are sold.

PHOTOGRAPHY APPLIED TO MILITARY PURPOSES.

We are indebted to Mr. Spiller, a gentleman whose name must be familiar to all photographers, and whose experimental skill and rare scientific acquirements have acquired for him the honourable post of photographer to the Royal Military Repository, Woolwich, for an opportunity of inspecting a series of photographs illustrative of a part of the course of instruction given to the non-commissioned officers of the Royal Artillery. The photographic album, lately transmitted to the War Office, includes a number of illustrations, in a complete series, of the successive operations gone through in working heavy ordnance; such as the serving of guns, mounting and dismounting, the use of sheers, gyns, and cranes, for raising, lowering, or otherwise disposing of the ponderous masses of iron which constitute the 56 and 68 pounders of the present day. The several processes of embarking and landing guns, and the mode of adapting the tackle for these purposes; together with the construction of the heavy gun raft, represented in four different stages, are clearly shown; these, together with some of the various forms of military bridges, constitute the principal objects which have, during the past summer, been brought within the scope of photography.

Considered as photographs merely, these pictures are of the very highest order, many of them have the advantage of a picturesque back-ground of fine foliage, which, combined with water, has in no small degree contributed to the general effect; while, in a military point of view, it cannot be doubted that much value will be attached to the accuracy of detail; such, for instance, as that shown in plate 34 of the new pattern triangle gyn; which proves that, on account of their fidelity, photographs must eventually supersede even the most carefully-executed drawings. As an aid to instruction at the Royal Military Repository, photography must be regarded as of the highest value; serving, indeed, the same purpose as the diagram to the lecturer.

Critical Notices.

Stereographic Illustrations of Compositive Photography. By J. Elliott.

We have, on several occasions recently, animadverted upon a department of compositive photography, which we thought called for a remonstrance on our part. Since then we have pushed our inquiries further on the subject, and have made it a special point to watch the progress or retrogression which might be perceptible. We have before us an almost complete history of the art in a series of the chief stereoscopic slides which have been published up to the present time. Amongst them we have, what we believe to be, the first of the kind ever issued, and this decidedly is of the class spoken of in our twelfth number as being sentimental, &c. Then follows the series of "My First," "One too Many," "Five weeks after Marriage," "Broken Vows," &c. &c. These are too well known to need more than the mention of their titles, and our opinion of them has long since been recorded in these pages. It is, however, but fair to mention, that those just enumerated are among the very first attempts in this branch, and as such, although they bear sufficient evidence of a want of thorough artistic skill, there is, at the same time, no little credit due to the ingenuity of the composer; this, in fact, we have ever been ready to acknowledge in all our notices. Taking, then, the new subjects which have been more recently published, we can still see traces of the imperfections which are so evident in the earlier productions; while, at the same time, there is a great advance in ingenuity, and a decided improvement in the powers of arrangement. For instance, a new slide of a wedding is much more naturally and yet elaborately grouped; and, instead of a Protestant clergyman, we have a Roman Catholic priest, and, as a matter of course, the elaborate furniture of a Roman Catholic altar, which gives greater facilities to the compositive talent of the arranger. Still it is but a transposition of the original idea; and a wedding is a wedding, whether the ceremony be performed by Catholic priest or Protestant clergyman. "The Orphan's Dream" is well grouped, and the representation of the floating dream is most ingenious; but yet there is scarcely that amount of poetic feeling in the rendering which we should like to see. It is too ambitious an effort, and the subject is one which can scarcely be touched by photography. "Homeless and Friendless," a slide not yet published, is well worked out as far as the placing of the figure goes, but the falling snow has a painful, dazzling effect, and the fallen snow is decidedly woolly. "The Fairy" is, perhaps, a still more ambitious effort than any of the preceding. It is the figure of a female floating in mid air, and behind whom is a background of stars. The pose of the figure is easy and graceful, but the astronomical background is rather out of place. We have puzzled our brains to find out in what exact constellation the brilliant group of stars which adorn this picture is to be found. They have evidently been stuck on by a non-astronomical photographer, while, unfortunately, the *sky* has a series of wrinkles, more suggestive of a stretched sheet than of the fair canopy overhead. These last mentioned are,

in our opinion, the least successful of the new series; but while we say this, we would acknowledge that there is a decided improvement upon the earlier and more crude attempts in this department, and in them there is hope for still greater success.

"The Reception and Profession of a Sister of Mercy," illustrated in two slides, are interesting, on account of the announcement that they "have been prepared with every regard to correctness of detail"—the artist acknowledging his thanks to those who assisted him in the composition, including "a venerable ecclesiastic, and an archbishop's lay secretary." The arrangement is very effective. The series, including "The Money-lender," "The Inventory," and "The Sacking of the Jew's House," are very decided steps in advance of any that we have yet seen. The manner in which they are respectively treated is very interesting; and, judging from the difficulties which must be overcome—such as the impossibility, we had almost said, of getting so many figures to be steady while the picture is being taken—the ideas are very well carried out. It is the above-mentioned difficulty which so mars the effect of these compositions; for, short as the time may be in which the negative is taken, it is sufficiently long to cause the models to become rigid and expressionless. Hence, in the series entitled "The Sacking of the Jew's House," though the grouping and arrangement are almost faultless, yet there is an apparent want of earnestness of expression on the faces of the principal characters.

These remarks are not made in any hostile spirit. It will be seen from the above, that we mark a gradual and decided progress in this department; and the faults pointed out, are not so much those of the composer as that they are inherent in this branch of photography: and we are glad to see that some of our most eminent photographers take an interest in elevating rather than degrading our favourite art.

EXHIBITION OF THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

The second annual exhibition of this association opened on Friday last—the "private view" being held on the previous evening—the attendance on that occasion was not large, and the show of pictures, both in quantity and quality, was below that of last year. Indeed we cannot see how it could be otherwise, for if the association has merely for its object the illustrations of architecture, and monuments to be found here and there, it must be limited in its scope; and no better proof of this can be given than the present collection. In it there is scarcely a picture which the regular visitor to photographic exhibitions has not seen attempted some time or other.

As yet the association is but an experiment, and it remains to be seen whether repetitions, or even new architectural subjects, are of sufficient interest to the majority of visitors to sustain it in existence.

Macpherson has illustrated Rome in one hundred and twenty views. Cimetta, Venice in thirty-three views. Melhuish, London in two views. Robertson and Beato, Cairo, in thirty-one views. Lousada, Spain in twenty views. Lowndes, Cocke, Frith, Bedford and Cade, in England, and Baldus, Paris, are also contributors with several other minor artists. Among whom our readers will be as much astonished as we were to find the absence of Fenton; this is to be regretted, for there are very few who will not remember with pleasure such choice specimens of architectural photography as his "Galilee Porch, Ely Cathedral," "the West Porch of York Minster," and pictures of that class.

There is something novel in the mode of the arrangement of the collection. There are no glazed pictures; the photographs are mounted on plain cardboard, after which they are nailed to the walls, and then a length of beading is laid along, and every set of four pictures is enclosed when convenient. By this means a great deal of space is saved.

We were much gratified to see that the managers had availed themselves of the hints we threw out in a former number with regard to the pricing of pictures, which gave so much offence last year. The manner in which the pictures are priced this year is by a series of numbers; each picture has a numerical value varying from 6 to 15, and any person who pays his subscription is entitled to as many pictures, of which the total numerical value shall not exceed fifty. This system, it is thought, will obviate much of the difficulty and dissatisfaction felt last year. The mode of placing all the work of each artist together, is one which has many advantages to the visitor, and which has been pointed out with regard to other exhibitions in the "Photographic News."

In noticing the pictures, the arrangement enables us to proceed with all the works of one artist; Rome, as we before stated, is illustrated by Macpherson, in one hundred and twenty views. In this number there is more diversity in the negatives, and more inequality in the printing than we ever noticed before in one artist's productions; and not only does this inequality occur in subjects of different classes, such as architecture and landscape, but also in subjects which ought to have been treated alike. There is, besides, on the average, a great want of half-tone in these pictures; the blacks and whites are too intense even when the picture is only moderately printed. In some instances, owing apparently to the inferiority of the lens, there is a violation of all received notions of gravitation, and certainly a great want of that which we are always led to expect in architectural drawings—mathematical precision; while, on the whole, these pictures lack that brilliancy which we have seen in other pictures of this city.

No. 1. "Temple of the Sibyl, Tivoli, seen from the opposite side of the Ravine," is a vigorous picture, in which there is a nice definition of light and shade, with here and there a good deal of detail. The picture of the "Temple of the Sybil seen from the Bridge" (2), is a great contrast to the one just named, there is scarcely any half tone, and an almost entire absence of perspective effect. "The view of the Temple of Pallas" (3), "Temple of Vesta and the Fountain" (5), "Columns of the Forum of Nerva" (9), "Arch of the Goldsmiths" (11), are all printed too darkly, and thus prevent anything like a minuteness of detail. "Easter Benedictions at St. Peter's" (7), has all the characteristics of *instantaneous* photographs of crowds, confusion and indistinctness. "Interior in the Vatican," styled the Philosopher's Hall (8), is as bad an attempt at an interior as we have ever seen. Interiors are at all times difficult subjects, as most photographers know, and therefore they should never be attempted unless the artist has full confidence in his powers. In "The Base of the Column in the Forum of Trajan" (12), we have a striking instance of the violation of the laws of gravitation above alluded to. We are only allowed to see the base of the column, and so we can form no correct opinion as to the degree of inclination of the column. But it strikes us as being several degrees greater than that of the Leaning Tower of Pisa, which is looked upon as one of the wonders of the world. "The Tomb of Cecilia Metella, with a distant view of Rome" (13), is a subject in which there is room for a great display of detail and half tone, but the artist has evidently failed to catch or treat it in accordance with the manner in which we are accustomed to see similar subjects treated. "The Castle and Bridge of St. Angelo, with the Vatican in the distance" (14), is a curious picture, as in it we see combined many of the faults of the whole series, but more especially inequality. The bridge and water, with the distant view of the Vatican, are printed extremely light, while the castle is very dark. "The Statue of Moses" (16), and the "Equestrian Bronze Statue of Marcus Aurelius" (17), have many good points about them, but as specimens of statue copying they are far below what we have seen. "Large view of the Claudian Aqueduct" (19), has many faults; the ruins are given with great distinctness and clearness, while the foreground is black and indistinct, and the back ground is not perceptible. "View over Rome from the Janiculum" (21), is far inferior to Mr. Fox Talbot's photoglyph of a similar view of Paris. "Forum Romanum, general view" (22), is much less brilliant and vigorous than the same subject treated by an exhibitor at the last exhibition of the society. "The Church of San Bernardino, Perugia" (25), "Cathedral of Orvieto" (26), are two of the most successful in the series, more especially the latter, in which we are enabled to trace with the greatest minuteness the whole of the architectural detail, and inspect the beautiful frescoes with which the front of this building is decorated. "A Group from a fresco by Luca Signorelli, at Orvieto" (27), is much inferior to the same subject as treated by Alinari Brothers. "The Garden in the Vatican" (44), is a subject

well calculated for a good picture, as there is great scope for showing to perfection the foliage of the trees, but in this instance they are rendered in black masses, with very little detail. We omit noticing a great number of this series, as it would only be a repetition of the faults and blemishes we have already pointed out. We may just mention that in "The View of the Aqueducts—Aqua Claudia" (87), there is the same degree of uniformity of colour, the same absence of light and shade, the same smudginess and sootiness, which characterise the prints produced by the celebrated carbon process, as practised by Mr. Pouncy. We are at a loss to decide which of the two are the worst. Having thus impartially noticed this series and pointed out the most glaring defects, we would state that we do not speak with any bias on the subject of these productions; the foregoing are our honest convictions of the merits of Mr. Macpherson's pictures.

(To be continued.)

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

Imperfections and Spots.—The first colouring is now completed, and the picture is ready for varnishing. Before doing this, however, it will be necessary to attend to a point which, perhaps, ought to be looked to before commencing to colour—the "touching out" of imperfections and spots. Where these mischievous sprites have baffled the care of the operator, he must rely on the aid of the colorist. When, however, perfect pictures can possibly be obtained, faulty impressions should be, for the credit of photography, unhesitatingly destroyed. But it will sometimes happen that pictures good in themselves, and of which no other copy can be obtained, have a few minor defects which may be remedied by a skilful use of the pencil. For this purpose water colours must generally be used. Black spots in the background or draperies may easily be managed. The colours to be used must to some extent depend on the tone of the photograph; but a little chinese white, naples yellow, and sepia or indian ink, mixed to the proper tint, will generally answer: it must be applied on the point of a sable pencil, taking care to lay on no more than is absolutely required, so as to avoid the appearance of any excrescence of colour on the surface. Spots on the lights, especially on the face, are more difficult to manage; they must be carefully touched with chinese white modified by naples yellow to suit the tone of the picture: this should be tried on a corner of the plate first, to ascertain that the mixture perfectly harmonises in tone with the photograph; if this be the case and it be skilfully applied, taking especial care to use no more than just covers the spot, after the picture is coloured the defect will be scarcely observable. Cases will sometimes occur, especially in portraits of children, where the eyes have moved, or are not perfectly sharp. This may be remedied by the use of water colours. The pupil may be put in with indian ink, and the outline of the iris carefully traced with the same much diluted; the marking of the eyelids and eyelashes may be strengthened with indian ink, and the point of light put in with chinese white. Remember, however, that without some knowledge of drawing, and some little skill in using the pencil, no change should be attempted, as it is very easy by one false touch to alter the likeness and spoil the picture. Remember, also, that the free use of water colours will produce a coarse effect, from its want of harmony with the texture and surface of the glass picture; that their use is only permissible to remedy defects, and should be regarded as a *dernier ressort.*

Varnishing.—All defects remedied and the first colouring completed, the picture is ready for varnishing. The use of a suitable varnish is of importance both as regards its influence on the appearance of the finished picture, and the surface it presents for the second colouring. A common error in the manufacture of varnishes for photographs, especially for positives, is giving them too much body. Something more than the means of spreading an even layer of gum over the surface of the picture is required, whilst that is all that many of the varnishes seem intended to effect. This will certainly sometimes serve as a protection to the photograph, but at the same time it imparts a glazed, vulgar effect to the picture, and renders the subsequent colouring difficult and comparatively ineffective. A varnish which affords facilities for producing the most artistic results in the finished picture, should give depth and transparency to the shadows, without appreciably glazing or lowering the whites, which it should leave with a surface somewhat "flat" or dead. By this means the greatest depth and vigour of which the picture is capable is secured, together with a "biting" surface for the second colouring, on which any amount of brilliancy may be obtained.

We offer no recipes or suggestions for the manufacture of varnish, as we think that, generally, the attempt on the part of the photographer to make his own varnishes is a great mistake. Much more judgment and experience in the selection of gums and resins, and their solvents, than is likely to be obtained in the practice of most photographers, is requisite to ensure success in varnish making. Most amateur attempts result in the production of an article which, by cracking, blooming, or turning yellow, is likely eventually to spoil many good pictures, and at a price often exceeding that at which a good varnish may be purchased.

A varnish with a benzine or chloroform solvent generally gives the best surface for the second colouring; a spirit varnish, unless manufactured expressly for positives, in most cases yields a surface too hard and glassy. Spirit varnishes always require heat in the application, or they dry dull and opaque. Benzine varnishes dry bright and transparent without heat, but are better for its judicious application in damp or cold weather. Chloroform varnishes generally dry rapidly without any heat. A little care is required in the application of all varnishes, the same as in coating a plate with collodion, to secure an even film, free from waves and unequal patches, and to prevent a return wave at the bottom of a plate. This will be gained very easily by practice, and observing the instructions usually given by the makers on the label of each bottle.

Experience and observation will enable the colorist to determine beforehand the modification of each colour, as applied in the first colouring, which the varnishing will produce. As a rule, reds, yellows, and greens are the least affected, whilst dark browns, some blues, violets, &c., are almost destroyed by it, and are best therefore left until the second colouring.

(To be continued.)

Photographic Chemistry.

ORGANIC CHEMISTRY—(*continued*).

EXPERIENCE teaches us that oxygen may unite, either with carbon to form carbonic acid, or with hydrogen to form water. Now, as we have already stated, organic bodies being for the most part formed of carbon, hydrogen, oxygen, and nitrogen, it is by no means strange that certain of these bodies are modified, and, in some cases, wholly destroyed, by exposure to atmospheric air.

Fermentation—a term employed by chemists to indicate the spontaneous decomposition which animal or vegetable substances undergo under certain circumstances—is also one of the causes of modification or destruction of organic matters. Different organic substances that are eminently decomposable, and are employed to provoke fermentation in other bodies, are known as *ferments;* as, for instance, in the case of beer, a little yeast causes fermentation in the whole mass; or if the juice of grapes be exposed to a gentle heat, it begins to effervesce—it loses its transparency; a viscid scum rises to the surface; the taste is changed—it has now a *vinous* taste, and may, if properly managed, be converted into wine. During the process of fermentation the sugar

has lost a part of its carbon, which has been liberated in the form of carbonic acid, and the result has been the formation of alcohol. This liquor, having undergone the vinous fermentation, may be exposed to a sustained temperature of about 75°, when another change takes place. It loses its transparency, and acquires a muddy appearance. Its taste is also altered—it has become sour; the alcohol has changed into vinegar. This is called the *acetous fermentation*. By long keeping, this vinegar undergoes another metamorphosis. It loses both its acidity and transparency; it gives off a putrid smell; and has reached its final stage—*putrefactive fermentation*. It is to a species of fermentation of gall-nuts crushed in water that photographers are indebted for gallic acid—the tannic acid originally contained in them being converted into gallic acid. There is another way of preparing this acid, but we will not refer to that at present.

Contact with the air and fermentation are not the only means of decomposing organic substances. Chemists accomplish this in various ways; sometimes merely separating one substance from the other, or otherwise reducing it to its *elements*. Chemists are not merely destructive, however; by their knowledge they are able, with the aid of the elements, to reproduce many of the substances we find in animals or vegetables.

Organic bodies may be classed in three categories—acids, bases, or indifferent bodies.

Organic acids, whether natural or artificial, are very numerous. Hitherto, but few of these have been employed in photography. Among these may be included acetic acid, citric acid, gallic acid, pyrogallic acid, and tartaric acid. Very many of these bodies possess the property of reddening litmus, and they all combine with bases to form salts, just as the mineral acids do, from which they differ in being more complex in their composition.

The organic bases have also been termed *organic alkalies* or *alkaloids*; all of them resemble ammonia in their properties and their mode of combination. These bodies can unite with acids to form salts. As a rule they are not very soluble in water; some of them, however, communicate an exceedingly bitter taste to water. They are for the most part solid, and are capable of crystallising; a few of them only are liquid. Most of them are medicines, and some of them are very powerful poisons. We may enumerate, among others, morphine and narcotine, which are the alkalies of opium; nicotine, the liquid alkali of tobacco; strychnine and brucine, alkalies of the nux vomica, &c.

Among the indifferent bodies there are many which are employed in photography; and, foremost among them we may quote pyroxyline, cellulose (paper), gum, sugars, alcohol, ether, albumen, gelatine, and wax.

(*To be continued.*)

Dictionary of Photography.

Adhesion, Attraction of, (*continued*). — The use of the numerous cements employed by photographers to mount photographs and build up glass dishes and baths, depends upon the attraction of adhesion; and a little reflection on the very varying degrees of force which is exerted by the same cement between different bodies will show how this attraction varies with the substances exerting it. Gum or paste, which will cement paper, will not answer for glass, as this requires some resinous body. It must be remembered that a cement should always be used thin, as its readier adaptation to the varying changes of temperature prevents that destruction of the cohesion of its own particles which would gradually take place were the cement to be used thick. Sometimes the force of adhesion between the cement and the body which it unites is greater than the actual cohesion of the particles one with another of that body. Thus pieces of wood which have been glued together and then torn asunder will frequently not separate at the layer of glue, but at a fracture in the wood itself. Paper photographs may be easily split into two laminæ by cementing a piece of linen fabric firmly on to each side, and when quite dry separating them. The cohesion of the particles of the paper one with another being less than the adhesion of the cement to the paper, the latter separates into two films, which, by dissolving the cement which holds them to the linen, may be washed, dried, and ironed.

Affinity.—The various bodies which surround us are all formed of an inconsiderable number of simple substances or *elements* united one with the other in different proportions by certain forces, to which has been given the name of *affinities*.

These *affinities* are of two sorts. One, by virtue of which the molecules of bodies adhere together, is known under the name of the *affinity of aggregation*, or attraction of cohesion, which we have recently described. The various degrees of this affinity govern the differences which are apparent in the resistance of bodies to external force. When it is considerable, the substances are hard and solid; when inconsiderable they are liquid; and when this force is still more diminished, they become gaseous. These three states of bodies—the solid, liquid, and gaseous—are called *forms of aggregation*. On this affinity of aggregation depend also the regular forms which are assumed by certain bodies when they pass from the liquid to the solid state; this is known in chemistry by the term *crystallisation*. Hardness, softness, toughness, brittleness, &c., are equally modifications of this form. Its powers may be mechanically overcome by pulverisation or similar operations, and chemically by the action of heat.

The other kind of affinity is known under the name of *affinity of composition*, or *chemical affinity*.

It is only exercised in compound substances, between the simple bodies of which they are composed. By its means two bodies are enabled to unite, and give rise to a third new substance, which frequently does not possess a single inherent quality of the substances of which it was compounded. Thus chlorine and silver are enabled, by means of their chemical affinity, to unite and form the white powder, chloride of silver.

For this reason, it is customary, in describing the two kinds of affinity, to call the first—that of aggregation—a force exerted between homogeneous substances; for example, between the separate molecules of chloride of silver: whilst the second—chemical affinity—is exerted between heterogeneous substances; for instance, between chlorine and silver.

Chemical affinity is modified in several ways, of which the following are the principal:—

1. It is never exerted in an equal degree between all bodies, but always with a force greater in one than in the other. Thus, zinc has a greater affinity for chlorine than silver has; so that, if a piece of zinc be mixed with moist chloride of silver, the chlorine will leave the silver and go to the zinc—for which it has a greater affinity—forming chloride of zinc, and leaving the silver in the metallic state. This modification of chemical affinity is known by the name of *elective affinity*, because a substance seems always to choose, from those with which it is placed in contact, the one for which it has the most liking or affinity.

(*To be continued.*)

A Catechism of Photography.

THE ENGLISH WET PAPER PROCESS—(*continued*).

Q. How is the photographic image taken by this process developed?

A. About a third of solution No. 2 (aceto-nitrate), and two-thirds of solution No. 3 (gallic acid) are combined, and in this combination the proof is immersed. From ten minutes to a quarter of an hour is the ordinary time for developing a picture, but this of course depends on circum-

stances, and the operator must be guided by his own judgment as to the time at which his picture is fully developed.

Q. How is the process of fixing conducted?

A. By the application of the solution No. 4 (hyposulphite of soda).

Q. Explain the philosophy of this process?

A. Upon a sheet of paper is spread a concentrated solution of iodide of potassium and iodide of silver. The paper, having been saturated with the liquid, is dried. It is then plunged into a basin of water, and the double iodide is decomposed, the iodide of potassium being dissolved, and the iodide of silver liberated, so that it rests on the surface of the paper, and gives to it a pale yellow tint, the result of the excessively minute molecules which unquestionably contribute to the perfection of the picture. The paper must remain for some time in the water, in order to insure the equalisation of the desired effect. A considerable quantity of water is also necessary; and, finally, the water must be changed frequently, as the pictures would otherwise be more or less affected by the particles of the iodide which would remain in the bath from previous manipulations. When the paper is removed from the bath one of its surfaces is coated with iodide of silver, and *it is not sensitive*. If over this coating of iodide of silver there is spread a weak solution of nitrate of silver, *the surface becomes sensitive* and is ready to receive the impression of light. The degree of sensitiveness varies according to the proportion of the nitrate of silver, which is easily regulated at will.

OTHER PROCESSES ON PAPER.

Q. Are not photographic papers frequently used wet from the bath without being previously dried?

A. In the wet paper process, the paper is submitted to the action of light immediately after being taken from the aceto-nitrate bath, without being either washed or dried. A piece of white paper, well soaked in water, is spread upon the glass fitted to the frame of the camera; upon this the prepared sheet is placed, the sensitive side upwards. The paper, which is placed beneath, must be free from spots of iron or other impurities. It is also necessary to mark the side of the glass which ought to be at the bottom of the camera, and to keep it always inclined in that direction when the papers are applied: if this precaution is neglected, the liquid collected at the bottom, in falling over the prepared paper, would not fail to produce spots. The paper thus applied to the glass will remain there for an hour without falling off, and can be placed within that time in the camera. The results of this process, however, are not, in most cases, so good as by the dry process.

Q. How are pictures so taken, developed?

A. By gallic acid. They are fixed in the usual way with hyposulphite of soda.

Q. How may increased rapidity of action be attained?

A. M. Humbert de Molard gives the following plan:—First bath—

Distilled water	500 centimètre cubes.
Iodide of ammonium	20 grammes.

After drying, the paper is floated on the second bath, composed of

Water	250 centimètre cubes.
Nitrate of silver	16 grammes.*
„ zinc	8 grammes.
Acetic acid	8 grains.

Papers so prepared are exceedingly rapid in action. For views, an exposure of one or two seconds is amply sufficient in the sunlight, and five or six in the shade; for portraits, from fifteen seconds to one minute. The picture is developed by passing over the surface a solution of gallic acid, with a few drops of a saturated solution of acetate of ammonia. The picture must afterwards be thoroughly washed in clean water, and fixed by the ordinary process.

* 15½ grains English.

DRY ALBUMEN PROCESS.

Q. Is the albumen process at all employed by photographers upon paper?

A. It is. The process consists in replacing, by albumen or white of egg, the liquid in which is dissolved the iodide and bromide of potassium. The albumen is coagulated on the paper by a bath of aceto-nitrate of silver, which renders the surface sensitive to the action of light. It forms a very fine surface on which to take impressions—possessing peculiar sharpness of outline and delicacy of detail. Sometimes waxed paper is used; sometimes ordinary paper. Some photographers immerse the paper in the albumen bath, so as to cover both sides; others, on the contrary, only float it on the top of the bath, by which means one side only is coated. There are many variations in the methods adopted, some less difficult than others, but all being in the main principles the same.

Q. Detail the ordinary process?

A. The albumen is prepared in the following proportions:—To the whites of eight eggs add 15 grains of iodide of potassium and 3 grains of bromide of potassium. Each egg must be broken separately into a shallow cup, and the yolk retained in the shell as well as the germ; then poured into a measure, until the required quantity of albumen is obtained. Before adding the iodide of bromine, the germ of the eggs must be carefully removed; they must then be shaken up in a wide-mouth, rather large bottle, until the bottle is filled with white foam; it must then stand eight or twelve hours in a cool place; the clear albumen can then be poured off into a basin or plate; and after having laid a piece of paper on the surface in order to remove any air bubbles, the paper to be prepared—either waxed or otherwise may be applied; after contact for about five minutes, the paper may be withdrawn by a slow, regular movement, and hung up to dry. The albumenised side of the paper may afterwards be applied to the aceto-nitrate bath.

Q. How is this bath prepared?

A. The aceto-nitrate bath is a solution of nitrate of silver and crystallised acetic acid.

Q. When the paper is prepared in the aceto-nitrate bath, is it ready for use?

A. After receiving the sensitive coating in the aceto-nitrate bath, the prepared paper is washed in pure water, dried—as in other processes—and reserved for use. The whole of the subsequent operations are identical with those which have already been described.

(To be continued.)

Correspondence.

THE PHOTOGEN.

Dear Sir,—The information you ask for in your Notices to Correspondents, p. 180, with reference to this light is best afforded by a few extracts from the printed specification of the patent, which I happen to have by me.

The invention is described as being for "Improved Apparatus to be used for Burning Pyrotechnic Compositions or Preparations for producing Artificial Lights of various colours;" and the specification states as follows:—

"My invention of improved apparatus to be used for burning pyrotechnic compositions or preparations, relates to a means of burning any of the chemical compounds that are usually employed for producing various coloured lights such as are required for theatrical performances, some of which chemical compounds will, however, produce lights of such a quality as will admit of their being used for photographic purposes. The ordinary mode of burning these compounds for theatrical or other purposes is, to place them in an open vessel in which, when ignited, they are allowed

to burn until consumed. While burning, the composition will give out a brilliant light, the colour thereof depending upon the particular composition that is employed. During this combustion a pungent and suffocating vapour or gas is evolved, which, when the composition is burned in close buildings, is very annoying and disagreeable.

"The object of my invention is to burn these compositions, and obtain the light therefrom, in such a manner as to prevent the noxious vapours or gases from annoying persons in the immediate neighbourhood of the apparatus."

Then after detailing at length how he effects his object—by burning the composition in a vessel surrounded by glass, with a current of air passing through to carry off the gas, the inventor claims as follows:—

"In conclusion I claim, as the invention secured to me by letters patent as aforesaid, the application to the purposes above mentioned of apparatus such as that hereinbefore described, and shown in the drawing, *or any mere modification thereof*, in which pyrotechnic compositions may be burned to produce various coloured lights, and the gases or vapours evolved therefrom carried off, so as not to annoy bystanders."

The Queen's Printers' copy of the specification is published at the Great Seal Patent Office, 25, Southampton Buildings, Holborn.

You will collect from this that the patent only extends to the lantern.

Pentonville. THOS. W. B. COOK.

ENLARGED PICTURES FROM SMALL NEGATIVES.

DEAR SIR,—For taking enlarged collodion positives from small negatives, I use the same large double-bodied camera as for taking the microscopic objects. It should have several false fronts to slide into the grooves, with a piece cut out exactly in the centre, to suit different sized negatives. This piece should be cut out rather smaller than the negative, and a piece of thick card-board, having the portion cut out exactly the size of the negative, and with a margin about an inch wide, should be glued on to it, so as to form a bed for the negative; to this a piece of card-board, with the opening again rather smaller than the negative, should be hinged at the upper part by a piece of sheet India rubber, so as to fall down over the negative and keep it in its place, it may be fastened down with a sharp nail. The dark slide should have a nest of frames, fitting one within the other, to suit different sized plates. The focussing glass should have the size of each plate marked on it in pencil, and measured from a common centre. The double combination of lenses, with half inch stop, should be screwed into the inner camera with the back lens towards the negative to be copied. The negative must be placed with the collodion side towards it. The inner camera must then be placed in such a position between the negative and focussing glass that when the latter is drawn out to give the desired size, the image must be perfectly *sharp* and *clear*. The negative must, of course, be turned towards the strongest light, *but not towards the sun*, if shining. I have never found it necessary to use a mirror to concentrate the light on the negative. The collodion, the bath, and the developer are the same as I use for the magnified microscopic objects. When the prepared plate is placed in the frame, a piece of flannel or double blotting-paper should be placed on the back of it, and the springs of the back shutter will keep the plate in its place. The first result will, of course, be an enlarged positive, viewed by transmitted light; from this a negative may be taken on collodion in the camera any size required, or a negative may be printed from it on paper, which may be waxed. The time of exposure must depend upon the strength of the light, and the character of the negative to be copied—as regards sharpness, I have never found any loss of it if care be taken in the focussing. On the contrary, up to a certain size, I have found greater sharpness in the enlarged positive, the details being much more evident. By this process, transparent positives for the stereoscope may be taken of any required size, from the original negative. Microscopic positives may also be obtained by it, by increasing the distance between the negative and the lenses, and using a stop of small diameter. In this case, sunlight passing through the negative is desirable. When an enlarged negative on collodion is desired, and the positive is not wanted to be kept, it is better to take a positive a very little larger than the original negative, and enlarge from that, as it saves collodion, &c. An enlarged negative may readily be taken off the glass and mounted on thin paper, which may be afterwards waxed, but the negative must be mounted with the same side to the paper as it was to the glass.

Reigate. THOMAS BARRETT.

Photographic Societies.

MACCLESFIELD PHOTOGRAPHIC SOCIETY.

THE members of this society have continued to meet during the season—and on several occasions very interesting papers have been read. A numerously attended special meeting was held on the 14th instant, for the transaction of business connected with the practical working of the society, at which, after hearing the statements of the secretary and the treasurer with regard to its present position and prospects, some minor changes in its arrangements were agreed to; and a committee was named to carry out an object towards which some steps appear to have been taken already: viz.—the organization of an exhibition of photographs, &c., under the auspices of the society, in connection with the annual exhibition about to take place at the Government School of Design. Pictures for the exhibition will have to be forwarded to F. M. Mercer, Esq., the secretary, before the end of the year, and the exhibition itself will open during the first week of January.

FRENCH PHOTOGRAPHIC SOCIETY.

AT the last meeting of the society Count Olympe Aguado presented a numerous series of stereoscopic proofs of large dimensions. Some of these proofs were due to Viscount Onesyme Aguado, and these were of the greatest originality. The subjects were taken from a bird's eye point of view. It was impossible to appreciate them with the naked eye; but viewed in M. Quinet's large stereoscope they presented surprising effects of foreshortening and a striking clearness. Thus one of these proofs, which to the naked eye appeared as a confused mass, showed in the stereoscope a seated individual, whose figure was brought out perfectly in all its details.

M. l'Abbe Moigno also presented a series of small pictures which were forwarded to him by Mr. Fox Talbot, and obtained by this distinguished experimentalist by means of his latest process.

M. Lemercier presented some pictures obtained by photo-lithographic processes, which left nothing to be desired, especially if, as M. Lemercier affirmed, they were really exempt from all retouching.

M. Lemercier further declared that no photographic pictures could approach the low price of those he presented, which cost only 35 centimes the sheet.

M. Charles Chevalier presented a travelling camera which appeared well made, although very complicated. Owing to the numerous changes made in constructing it the inventor was not able to name the cost, but thought it would range between 300 and 350 francs.

M. Humbert de Molard described a new toning bath which gave a very pretty tone to pictures.

M. Selmer, a distinguished chemist, presented a rich and picturesque collection of Swedish and Norwegian costumes.

M. Auguste Leborgne asked permission to present proofs and to make before the meeting a photographic experiment *à la lampe;* but so many novelties were inscribed on the paper, that he was asked to defer his experiment until the next sitting.

Some interest was felt in M. Leborgne's proposed experiment, in consequence of his using a product of his own discovery in lieu of the nitrate of silver. This product he terms oxy-ethylate,

and a good deal of incredulity is expressed as to its capabilities; several who pretend to know the composition of this new substance assert that it is nothing but his old silver solution. —*Condensed from the "Revue Photographique."*

Miscellaneous.

On the Preservation of Photographs.—Complaints of the fading of silver prints are so common, that, though it may not in many cases be possible to prevent this catastrophe, we will point out a few precautions, by following which it may at least be delayed to the latest moment, if not postponed indefinitely. One of the causes of fading, and that which is most generally assumed to be *the* cause, is imperfect washing; but there are other causes which can be more easily guarded against, and these are, exposure to damp, sulphuretted hydrogen, sulphurous vapours, combustion of gas, and laboratory effluvia generally. To preserve silver prints in good condition, a portfolio is absolutely essential; and whenever the prints are taken out for the purpose of inspection they should invariably be restored to their proper place when this is completed, and the portfolio carefully closed. The last-named article is one of considerable importance, if it be desired to preserve the pictures in the same state of purity as when they were first placed therein. Unfortunately there are few which are as perfect as they might be; they are usually open at the sides, so that dust, and to a certain extent light, can creep in; moreover, the edges of the pictures fall below the level of the solid sides when the portfolio is held upright, and consequently, when it is dropped beside the book-case on the table, or when it is placed on the table for the purpose of opening it to add to its contents, or otherwise, the edges of the pictures are brought under considerable pressure, and are gradually damaged, and rendered unsightly. The best portfolio we have met with was one which is described in our advertising columns under the well-deserved name of the only perfect portfolio. It is so contrived that, no matter in what position it may be placed, the edge of the picture cannot come in contact with anything except the leather on which it rests, which is suspended, as it were, between the two sides. It has also another recommendation, the surfaces of the pictures are not subjected to unequal pressure in different parts; indeed, unless the portfolio be over-filled, there is no pressure of any importance on any part of them: besides this, one of the covers is furnished with leather flaps, which lap over the three open sides and are retained in their places by elastic, to the ends of which are attached a kind of hook that fits into a lock, and which lock is closed by simple pressure, though a key is necessary to open it, and the portfolio may then be said to be hermetically closed against light and dust. It has other advantages, but it is not necessary that we should enumerate them, as they bear merely on the question of convenience, and do not affect the subject on which we have based the preceding remarks, viz. the careful preservation of photographs.

Photographic Notes and Queries.

SUBSTITUTE FOR A DARK TENT.—STREAKS ON COLLODION PICTURES.

Sir,—As some of your correspondents want a cheap dark tent, I will give you a description of a simple one of my own construction, which I have been using for some time. It consists of a box about 18 inches long, 16 inches broad, and 10 or 12 inches deep. A hole is to be cut in the bottom about 6 inches square; this, being glazed, is to serve as a window, which must be covered with a yellow blind. Next procure about 2½ or 3 yards of black calico, and sew the ends together; this will form a kind of bag, which is to be lined inside with yellow calico. One end of this bag is then to be nailed round the edges of the box, and *plaited* so as to leave it *full*, and the other end furnished with a "running string." Into this end the operator is to thrust his head and shoulders; and then, having his hands inside, he is to draw the string round his waist *tightly*, so as to shut out all light except that which enters by the window, or penetrates the calico. After tying the string, the operator finds himself in a *chemically* dark room, where he may go on with his work very conveniently. It will be well to blacken the inside of the box, so as to prevent any light finding its way into it through any chink or crevice. When I am taking portraits of families at their residences, I set the box on one of its ends on a table near a window, or other convenient place, where there may be a sufficiency of light. In taking views, it is easy to find some bank of earth or a low wall near the scene of operation, for the purpose of resting it on instead of a table.

With regard to the muddy streaks on the negative which some of your correspondents complain of, I think they are caused by allowing the nitrate of silver solution to flow over the plate in *streaks* after draining it into the bath before exposure. If the plate be *thoroughly* drained into the bath, one corner of it being allowed to touch the dipper, so as to take off the drop that seems to linger on that corner, and the plate be placed immediately in the dark slide, keeping it in a vertical position so as not to allow any drop of the bath to find its way across the film, those streaky stains may be prevented. Hoping this will find a place in your valuable periodical, I am, &c., A. Horan.

ILLUMINATED PAPER STEREOGRAMS.

Sir,—Noticing in your last number a query as to the best mode of procuring "Illuminated Paper Stereograms," I would suggest the following method as being at once easy and successful:—Print as usual on *thin* albumenised paper; then take a piece of thin, foreign negative paper of the same size, and fasten it slightly at the corners to the face of the print. Hold it against a window, and trace on the paper the outline of the object. Then separate the papers, and paint the *paper* a dark blue for the sky, filling in the other parts with the proper colours, then colour the back of the print in the same manner with rather paler colours, and when dry fasten the papers (painted side inwards) together. If a moon is required, cut through the double paper, and put a piece of thin gelatine at the back; if clouds are wished for, colour the sky with some dark colour, and the side towards the light must be touched with white wax, or light clouds may be waxed only. The method I adopt is to hold the *paper* over a lamp, and just touch it in the places where I want the clouds with the wax. Of course I only wax the *paper* so that it does not spoil the print, and it must be done before they are fastened together. For an illumination the coloured lamps must be pricked with a fine needle, and strips of gelatine placed behind. For a room, or like subject, I only paint the back of the print, and place a piece of thin paper behind to hide the colour. For a fire, I cut with a penknife through the picture, and put gelatine behind. C. H. P.

VARNISH FOR GLASS POSITIVES.

Formula:—"Bitume de Judé," dissolved in chloro-benzine" to the requisite thickness.

Sir,—Having seen an article, about a fortnight ago, in the "Photographic News," of this formula being requisite, I have much pleasure in sending you the above receipt as one I have always found to be economical and durable; it does not in the least attack the whites, and brings out a picture requiring vigour.

In mounting, care must be taken not to employ glue or flour paste, as they have the property of tearing off both varnish and collodion, which adhere to the substances behind them in broken fragments.

When the "chloro-benzine" cannot be procured, varnish with a weak solution of gum arabic, in which dissolve a small piece of sugar candy, to prevent it from cracking. When dry, any sort of black may be used without, in the least, altering the colour of the picture.—Yours truly,

Cherbourg, 7th Dec., 1858. X.

VARNISH FOR PAPER STEREOGRAMS.

SIR,—Will you or any of your correspondents be so kind as to tell me—

1st.—*How*, and with *what*, to glaze a stereoscopic slide, *after* it has been coloured?

2nd.—What are the *best* colours to use—liquid or cake?

3rd.—What is the *best* liquid to grind cake colours in?

I have tried the "varnish for paper stereograms," at p. 95, vol. i., and find that, however lightly the gelatine is laid on, it re-dissolves the colours, and they spread or run over the whole print. Gum water does the same: and as to the gum dama, dissolved in coal naphtha, it will not do at any price; when it is laid on the print, it immediately darkens, the whites become a smoky, dirty colour, and the paper appears as if it had been brushed over with oil—it is semi-transparent. What I want to do is, simply to be able to varnish a coloured print, without disturbing the colours.

H. H. J.

CARDBOARD DISHES.

SIR,—I have for some time past thought of substituting baths, trays, dishes, well-baths, &c., of cardboard, coated inside with gutta percha, for the earthenware and glass ones now used. The gutta percha could be applied as a solution, in benzole, chloroform, &c. The only thing, perhaps, to recommend this plan, is the cheapness and facility with which they can be made. No doubt it would be very useful in preparing papers for the negative and positive processes. If you think this is likely to be of use to any of your numerous correspondents, please insert it in your valuable journal. J. C. S.

DRYING GLASS POSITIVES.

SIR,—I have a slight hint to give to the practical as well as amateur photographer on the subject of positive collodion pictures. I dry my portraits after they are taken on a small tin saucepan containing a little water, and kept over a stove boiling. Place the portrait with the collodion side up, and it will dry instantly; by this means not only is the painter allowed to use his colours with greater ease, but it also sets the collodion so firm on the glass, that there is no danger of rubbing; and if you pass your hand over it, you will not in the least deface the likeness.—Yours obediently,

Chippenham. A FOREIGNER.

ORMOLU FOR COLOURING GOLD FRAMES—FORMULA WANTED.

SIR,—Could you, or any of your correspondents, give me a good recipe for making a nice *flat* and dark ormolu for colouring gold frames? By doing so, you would confer a great favour. A GILDER.

FIELD ROLL FOR TOURISTS—SYNOPSES OF PROCESSES.

SIR,—As you were pleased to approve of my suggestion of "What to Avoid," I am induced to submit for your consideration another idea which I have found useful in each process as I have severally begun them. I found that if I read and re-read one description of a new process until I thought myself up to making a trial, yet, though I knew what was to be done, sometimes I forgot the exact order of the steps, and, in searching it out from a long description, maybe the plate or paper was getting spoiled through having to wait. I therefore prepared and stuck up in my operating room a synopsis of each process, which aided me at once. If, then, you think the publishing these would be of any use to beginners, they are at your service. I therefore enclose some copies for your inspection.

I also enclose my field roll, as I call it, which I read over just before I start, and thereby avoid the annoyance of leaving anything behind. H. S. I.

FIELD ROLL FOR TOURISTS.

When you take the field near home, remember to carry,

For dry plates or paper—

Camera, lens, and stops.
Stand and screw.
Focussing cloth, and glass.
Slide, and frames.
Plate box and plates, or portfolio.
Yellow bag.

For wet collodion in addition—

Bath, cover, and dipper.
Developing glasses.
Water cistern.
Cleaning cloths, and chamois.
Holders, pneumatic and cleansing.
Levelling stand.
Level.
Waste dish.
Solutions,—bath, cleansing, collodion, developing, and fixing.
Tent or other contrivance, and its accompaniments.

H. S. I.

SYNOPSES OF PHOTOGRAPHIC PROCESSES.—WET COLLODION FOR NEGATIVES.

Clean plates.
Coat with collodion.
When set (10″ to 20″) immerse in bath, in 30″ lift out and in two or three times, when ready (1′ to 5′), move out and in till greasiness is gone, and drain off bath as much as possible.
Place in dark slide.
Expose.
Develop; keeping solution in motion.
Wash.
Fix; complete when yellow iodide is gone.
Wash well.
Dry.
Varnish.

Plate cleaning solution, vide "PHOTOGRAPHIC NEWS," vol. i. p. 156.

Developing solution:—

Pyrogallic	1	grain.
Glacial acetic	7	minims.
Alcohol	7	"
Water	1	ounce.

Use more pyrogallic and less acetic in cold.

Fixing solution:—

Hyposulphate of soda	½	ounce.
Water	1	"

H. S. I.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not allow many hours to elapse between printing a positive and fixing it.

Do not allow any unexpected phenomena in photography to pass unrecorded.

Do not attempt to take a picture until you are quite certain that no failure can arise from the use of imperfectly cleaned materials.

Do not attach too much importance to exact formulæ.

Do not allow the sun to shine on the lens when taking a picture.

Do not put away pyroxyline in a damp state.

Do not keep positives in a damp place.

Do not imagine that a new process must necessarily be better than an old one.

Do not use alcoholic solutions in cemented glass dishes.

Do not open an ammonia bottle in the operating room.

ANSWERS TO MINOR QUERIES.

Varnishing Daguerreotypes.—*F. X. Z.* We do not like the application of any varnish to the surface of these delicate pictures. In 1839, Daguerre wrote:—"The author made attempts to preserve his sketches by means of different varnishes obtained from amber, copal, india-rubber, wax, and various resins; but he has observed that, by the application of any varnish whatsoever, the lights were considerably weakened, and, at the same time, the deeper tones were hidden. To this disadvantage was added the still greater injury from the decomposition of the mercury by the varnishes tried." Now that Fizeau's plan of fixing the image with gold is so universally adopted, the varnish may not perhaps be quite so injurious, but still all the varnished daguerreotypes which we have seen have had their artistic beauty impaired by the operation. Some years ago varnished daguerreotypes were introduced under the name of enamelled daguerreotypes; they were, however, not so pleasing to our taste as the ordinary picture on silver plate.

Revival of Faded Positives.—*C. A. A.* No method is known by which faded positives can be restored to quite their pristine vigour. We have sometimes used a plan, first recommended, we believe, by MM. Davanne and Girard, which consists in immersing the faded positives in a dilute solution of chloride of gold for some hours, and then exposing to the light. Afterwards pass through hyposulphite of soda, one ounce to a pint, and wash well.

Bromide of Calcium.—*Albumen.* Bromide of calcium has been used as an addition to the iodide of potassium, both in the collodion and collodio-albumen processes. It may be prepared as follows:—Take 10 ounces of water and 390 grains of pure bromide, and mix them together, then add gradually 160 grains of clean iron filings, stirring well with a glass rod. As soon as the solution becomes light green in colour, add 200 grains of pure quicklime, which has been previously soaked by pouring water over it. Mix the lime well with it, and allow it to stand together for an hour, stirring occasionally; then pour on a filter, and wash the residue once or twice with distilled water. Collect all the clear liquids together, and evaporate to dryness in a porcelain dish. The residue, which will be bromide of calcium, must be carefully preserved in a well stoppered dry bottle, as it is extremely deliquescent. We have given the above method of preparing this salt, but unless our correspondent is tolerably *au fait* at chemical manipulations, he will find it far preferable to purchase it ready made.

To Protect a Collodion Negative from Scratching.—*A. Tyro.* We have found the following a very good plan for packing up glass negatives. Take a sheet of fine smooth paper an inch each way larger than the glass, place it on a perfectly flat table (on several sheets of blotting paper), and lay the negative face downwards on to it. Now fold the edges of the paper over the back and paste them down, taking care to have the paper stretched tightly over the face of the negative. The picture will now be secured against scratches, and the glass may be packed up in any desirable manner so as to guard against breakage.

Waxed Paper.—*P. Q. Raymond.* We have latterly been trying to remove the granular appearance which this paper sometimes has, by soaking the plain paper (English make), before waxing, in a mixture of one part strong hydrochloric acid and six of water. After remaining in this bath for an hour, remove it and wash several times in clean water, then dry and wax as usual; this, besides freeing the paper from spots, renders it beautifully transparent and quite free from granulation, but is very tedious and rather difficult to perform on account of the rottenness of the paper and the washing required to remove the acid from it. Where a little extra trouble is not minded to ensure good results, we can recommend this mode of proceeding.

TO CORRESPONDENTS.

*** *Our next number will contain a full description of the Editor's new method of printing photographs direct on to wood blocks for engraving purposes.*

T. N. S.—Pour a saturated solution of hyposulphite of soda on the glass plate; allow it to remain until all the yellow iodide of silver has disappeared; pour the solution back again into the bottle, and then wash by pouring several quarts of water over it, allowing some to remain on the plate for ten minutes, and then pouring more water over the plate.

W. S. B.—It will be impossible for you to make a small quantity of protosulphate of iron as pure as you can purchase it, and at as low a price. You will succeed best with dilute sulphuric acid and sulphide of iron.

R. P.—We hope, in a few numbers, to be able to give some information respecting the stoves.

A. H. W.—Received.

P. Q. (Seven Oaks).—Try the formula at vol. i. p. 66.

Antiquary.—Should have told us what size the picture was required to be. We can only suggest now a whole or half-plate portrait lens. We do not think that any patent stands in the way of the experiments referred to. The lens is worthless in a photographic point of view. We think the calotype cheaper than the collodion process. The other suggestions are received with thanks, and shall be attended to. We would willingly open our columns to "Antiquarian Photography;" will our correspondent commence the subject by favouring us with a few notes on the subject?

Amor Scientiæ.—The subject of photographing by means of the electric light is one which has frequently occupied the attention of scientific men; we ourselves have tried many experiments on the subject. Its great expense, however, and the uncertain character of the light, will, we fear, prevent its coming into much use until great improvements are effected in the apparatus necessary for its production.

W. H.—Send an address, and we will communicate with you on the subject.

Silicon.—It would be hopeless for any one who has only a knowledge of the mechanical part of glass grinding, to attempt the construction of a portrait combination. Very high mathematical skill is required.

Promoter.—1. Filter through a double thickness of filtering paper, and pour the filtrate back again once or twice; it will then come through clear. 2. Add a few grains of cadmium filings.

Halcyon.—1. Place the camphor in the clear filtrate. 2. Animal charcoal is preferable. 3. Yes, simply draining it. 4. Only once. 5. Throw it away.

C. H. P.—We do not think the stamped card-board mounts for stereoscopic paper transparencies are to be obtained in England.

J. T.—No practical process has yet been described.

G. H. W.—By all means attempt to produce a good negative at once: intensifying a positive does not give very perfect pictures, and it is far more trouble.

Tetrathionic.—See page 180.

W. G. P.—Our expanding camera has a body similar to an accordion; we have tried several, and think this plan the most perfect.

T. P. C.—1. The process you mention is a very bad one, and will never give you satisfactory results. 2. Albumen, 1 ounce; chloride of ammonium, 12 grains. 3. No. 3 is in type now, and can be procured through any of our agents.

D. N.—The plan you suggest will answer very well, but in that case the ordinary collodion process may be used instead of collodio-albumen. To print a transparent positive on a collodio-albumen plate, it is only requisite to press the negative and sensitive plate in contact, and expose to day or lamp light for the proper time (which must be found out by experience), and then to proceed with developing and fixing, as previously recommended.

F. V. B.—See answer to G. H. W.

Arbetawr.—We will endeavour to give a short account of the waxed paper process shortly. We once wrote a pamphlet on the subject, which was published at Chapman and Hall's. Try English photographic paper, soaked in hydrochloric acid, as recommended above.

One of Devon.—A friend of ours, *a Cornishman*, and an ardent photographer, intends shortly to visit Exeter, and is anxious for an introduction to "One of Devon." Have we permission to divulge our correspondent's address?

F. and A. H. Smyth.—We must know all particulars before we can do as you request.

J. Holroyd.—We do not know by what particular part of the process the transparent enamel photographs mentioned in our last number are taken. Perhaps some of our correspondents will favour us with information on this point.

J. F. M.—Can you not tell how the cement is made? Is it Indian rubber in benzol? We should like to have one of the labels. Many thanks for your polite wishes. We have two agents in Aberdeen, and should like to establish an agency at Dundee, if you can favour us with the name of any person who would become one.

Stereo.—A camera with twin lenses 3¼ inches apart.

P. M.—1. The same thing. 2. Explained in an early number. 3. Very difficult without special apparatus. You would not be able to manage it without going to some expense. 4. Accent on the *tog*. 5. We prefer them.

J. Moule.—In our next.

Annie.—The information required on the subject of Photographic Societies, will be found in the "Photographic News Almanack," which was published with No. 11. We have hardly decided, but we think six months. Our correspondent concludes her letter with the following recipe, which will, doubtless be of use to many of our readers this weather:—*Photographic Remedy for Chilblains.* If when they begin to be troublesome a little uniodised collodion be poured on, the ether evaporates, and leaves a thin insoluble coating, which prevents the skin from breaking, keeps off the air, and effectually cures them.

Communications declined with thanks:—W. H.—J. M.—Old Hypo.—F. W. W.—John.—Seacole.—T.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—A Novice.—A. F.—J. L. M.—O. W.—Mephistophiles.—B. C. P.—R. S. L.—O. E. N.—A Young Beginner.—O. S. S.—Laura.—B. M. K. O.—Xmas.

In Type:—Norma.—J. M.—T. Warwick.—H. C. J.—P. C.—Viator.—R. W. H.—J. T.—H. S. L.—S. S. B.—H. T. T.—One of Devon.—W. H. W.—C. F. B.—T. B.—An Amateur.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Petter and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 17.—*December* 31, 1858.

PHOTOGRAPHY APPLIED TO ENGRAVING ON WOOD (XYLOPHOTOGRAPHY).

IN accordance with the intention expressed in a previous number, we lay before our readers a description of a method we have devised for printing photographs direct on to wood; but before we describe our mode of proceeding we will offer a few remarks on wood-engraving, which may be interesting and instructive to most of our readers.

The art of engraving wood-blocks is coeval with the invention of printing; indeed, it would have been strange if it were not so, as the art of engraving letters in the old block-books would have suggested that the same process might be employed in reproducing figures of men and animals, and the rest would follow with improvements of the art. If we may assume that the date which the oldest engraved block in existence bears is correct, the art of engraving figures on wood was practised previous to the discovery of the art of printing. The block we refer to is that known as the "St. Christopher," and bears the date of 1423, while printing was not invented until 1437. Since wood-engraving has been practised there has been but little improvement in the tools employed; and if the engravings on wood are more beautiful than they were some years since, it is due to the superior skill of the engraver. The mode usually employed of preparing a block for engraving is, to whiten the surface with a mixture of flake-white and weak gum-water, either with or without the addition of a little finely-pulverised bath-brick; this is usually applied with the finger, and is rubbed off when dry. The object of this preparation is to give a surface which shall render the lines drawn by the designer distinctly visible to the engraver, whose duty is to engrave the block according to the design given. It is clear, therefore, that it is of the utmost importance for the design to be perfect, inasmuch as the beauty of the engraving depends chiefly on this being the case; hence the necessity for paying a high price for good designs. To give some idea of the cost of these, we may mention that as much as £6,000 have been paid by an eminent publishing firm for the wood-cuts which illustrate two volumes of a highly popular work now being issued by them.

Since the discovery of photography, frequent attempts have been made to take photographs on wood-blocks, but, we believe, with little success. The various operations it was thought necessary that the block should undergo before the photograph was finished ready for the engraver, occasioned the partial disorganisation of the fibres of the wood, which was thus rendered soft and unfit for the purpose. Various attempts have been made from time to time to overcome this difficulty; and among the most recent attempts to print a photograph on wood is that of Mr. Newton, who patented his process at the commencement of this year. We have not a copy of his specification at hand, but as far as our memory serves us, his process was as follows:—He took a limpid varnish and with it saturated the pores of the wood; this varnish was composed of a mixture of asphaltum, ether, and lamp-black, which was rubbed into the surface of the block with a piece of leather until, as we have already said, the pores of the wood were saturated. Collodion was then poured on in the same manner as on the glass plate, and sensitised in the silver bath, which was somewhat stronger than is usually employed for sensitising glass plates, and then exposed in the camera. It was afterwards developed with a solution composed of sulphate of iron, acetic acid, alcohol and water, and fixed in a solution of cyanide of potassium, and washed.

In previous processes of this description it was the custom to *coat* the surface of the block with varnish, in order to prepare it for the reception of the collodion film, which was transferred from a glass plate to the varnished surface. As may readily be imagined, the thickness of the united films, apart from any other reasons, must have seriously interfered with the operations of the engraver; and it appears to us that in this respect Mr. Newton's process could only mitigate the evil; and consequently, as far as we are aware, the process has not been very extensively adopted.

We now proceed to detail the result of our experiments, and we believe it will be found in practice that our process is free from those drawbacks we have indicated. We take a suitable block and cover it, in the darkened laboratory or by candlelight, with a mixture composed of *oxalate of silver* and water, to which may be added a little gum or pulverised bath brick, to suit the convenience of the engraver. The mode in which the oxalate is spread over the surface is precisely the same as that we have mentioned as being employed by wood-engravers in applying the mixture of flake-white and gum-water. A little of the substance, that is to say, about as much as would lie on a fourpenny piece, for a block four inches square, is sprinkled on the surface, and, the finger being then dipped in water (either with or without the addition of a little gum), the mixture is spread evenly over the whole surface of the block by rubbing the finger backwards and forwards across the block in various directions, until the evaporation or absorption of the water leaves the surface impregnated with a delicate and almost impalpable coating of oxalate of silver. The block may be then placed in a drawer, or any other place from whence daylight is excluded, and there left till dry, or for any length of time until required, as we have detected no deterioration or loss of sensitiveness, even in blocks which had been prepared six months ago, so long as they remained protected from the light. Oxalate of silver is susceptible of being acted upon by the actinic rays, and when the block has been prepared in the manner above indicated, it is only necessary to expose it under a negative in the printing frame to sunlight, and a positive picture is obtained in the same manner as on paper prepared in the ordinary way. The block requires no

subsequent washing, nor any preparation of any description, before being placed in the hands of the engraver; so that he receives it in precisely the same condition, as regards the surface to be operated upon, as under ordinary circumstances. The engraver, however, must not expose the block to the direct action of the solar rays while working at it, or it will gradually blacken on the surface; exposure to diffused daylight, however, has no deleterious effect on it, unless it be continued for a great length of time—say several hours.

We have before us, at this moment, a block on which a portrait was printed by exposure under a negative in the printing frame a fortnight ago; and, although it has been repeatedly examined and exposed to daylight, the portrait is as distinct, in every respect, as though it were printed on paper; and all that is required to keep it so is to preserve it from prolonged exposure to the light, which can be easily accomplished anywhere, it being only necessary to turn it face downwards on the table.

The advantages which may be derived from the adoption of our discovery are numerous. Among them may be enumerated the cheap and rapid transference of pictures of all kinds to the wood-block; and this rapidity is not one of the least of its advantages: for example, in the case of the *Illustrated London News*, it must not unfrequently happen that the same mail which brings the details of our operations in China brings also sketches from its artist there of the scenes of these operations. Now, everybody knows how rapidly the interest in such matters dies away in our busy country, and consequently how necessary it is that these sketches should be given to the public with the least possible delay. Such delay, however, must necessarily occur when these sketches have to be copied on to the wood-block by a draughtsman previous to the engraver commencing operations; but if this sketch be handed over to a photographer, he can, in the course of a few minutes, take a photographic copy of the exact dimensions required, which, in a very little time longer, can be transferred to the block, and the block be in the hands of the engraver. Besides the advantage of rapidity, the small cost at which the drawing can be transferred to a block would render it easy to have two or more blocks, so that when the first block showed signs of wear a second could be substituted for it—a very important consideration when an immense circulation is taken into account; and this applies equally to illustrated periodicals which have a very large circulation—in some instances extending to hundreds of thousands, require several duplicate blocks of the same subject to be taken by the electro-type process, in order to obtain a perfect impression, as apart from the question of time the wood would become irretrievably damaged. There is at present little probability of metal plates superseding wood-blocks in printing with type, and it is therefore of great importance that the drawings on these blocks should be made with the greatest exactness, and this can only be adequately attained by means of photography. It is not necessary that we should enumerate all the cases in which this extreme correctness is absolutely essential to convey a correct idea of the object sought to be represented, but we may mention the reproduction of anatomical subjects, of enlarged microscopic objects, and, generally, of all animals and vegetable specimens. We see no reason either why it may not be applied to the reproduction of stereoscopic views, which would, indeed, bring the stereoscope within the reach of the humblest classes. Of course the beauty and correctness of these views would depend, to a certain extent, on the skill of the engraver; but most engravers would succeed in producing a block which would be sufficiently correct for the purpose. Again, with respect to reduced photographic copies of maps or plans required to be printed with type, the reduced copies can be transferred to the block with the most perfect accuracy as to scale.

ON AN ACTION OF LIGHT HITHERTO UNKNOWN.*

BY M. NIÈPCE DE ST. VICTOR.

I have now to speak of another series of experiments, but still of the same kind.

A sheet of Swedish paper sized with starch only, and impregnated with a weak solution of soda, potassa, or cyanide of potassium, and insolated for about three hours, gives with tincture of curcuma a yellow picture in the part insolated, and red in the parts not acted upon by the light. If the paper is heated, it carbonises very rapidly in the insolated part. Swedish paper not sized with starch does not produce the same effect.

A sheet of paper sized with starch, such as is sold in commerce, insolated for about three hours, causes the blue tincture of turnsole to redden in the part insolated; besides this the size will be found to have been removed from the paper, or at all events to have changed its nature, inasmuch as the water penetrates immediately through the insolated parts.

The effect is still more sensible when the paper is impregnated with soda, potassa, or iodide of potassium; but a paper sized with gelatine does not become unsized under the influence of light, in the time in which a paper sized with starch does.

Ozonometrical paper, composed of starch and iodine of potassium, according to M. Cloëz colours under the influence of light; that depends on its degree of hydration, for if it is thoroughly dry it does not colour, but it becomes blueish the instant it is plunged in acidulated water.

Ozonometrical paper composed of red turnsole and iodide of potassium, slightly moistened and exposed to the action of the light under a negative, and passed in water after insolation, gives a blue picture in all the parts acted upon by the light; the parts not acted upon remaining red.

Under the influence of light, a paper impregnated with a solution of nitrate of uranium, especially if it is neutral, colours of a rosy gray tint more or less deep, according to the degree of moisture it possesses. The picture would have been coloured a very intense slate gray if it had been impregnated with a solution prepared in the following manner: take nitrate of uranium 10 per cent.; nitrate of copper 5 per cent.; and yellow oxide of uranium 2½ per cent., and heat to render the liquor entirely neutral.

If with this same compound a design is traced on paper, and exposed quite moist to the solar rays, in a very short time a colouring will be perceptible under the influence of the light; and what is extraordinary is, that this colouring disappears in obscurity, and reappears on being again exposed to the light, and this may be repeated a great number of times; but eventually the colour entirely disappears.

For the colouring to take place rapidly, it is necessary that the paper should be neither too moist nor too dry, a slight humidity is the most suitable. The colouring ensues rather rapidly even in diffused light; the longer the time of exposure, the greater its intensity, and the longer the time necessary for it to disappear in obscurity; if the exposure has been too long, the paper will always preserve a greenish-yellow tint.

A sheet of paper sized with starch, such as is sold in commerce, insolated under a glass negative, and passed in darkness in a somewhat concentrated solution of iodide of potassium, gives a red-brown picture, which becomes blue directly it is plunged in water; this reaction renders evident the weakest actions of the light on the starched paper.

A sheet of paper of commerce, sized with starch, exposed to the action of the light for about three hours, with half of its surface protected by a screen, and then after insolation plunged into a dish containing an alkaline solution of indigo, and left there for a few minutes, and afterwards passed in water, will, under the influence of the oxygen of the atmosphere, become of a blue colour in the part insolated,

* Continued from page 159.

while the part not insolated remains white. In the case of a similar sheet of paper, treated in the same manner, and plunged in a solution of sulphate of indigo, it is the insolated part which becomes white, and that which has not been acted upon by the light remains blue; the colouring becomes much more sensible if the paper is dried by heat and passed in a hot bath.

Logwood gives a red colouring to the insolated parts. The sheet of paper, treated in the same manner, gives no appretiable results.

It would be of importance to repeat these experiments, not only in the luminous vacuum. but also in the different gases; unfortunately it has not been possible for me to do this.

I have now to speak of stuff impregnated with salts of uranium.

If two pieces of cotton tissue be impregnated with a solution at 20 per cent., and then exposed to the sun, the one wet and the other dry, and half of each piece protected by a screen, it will be seen after an hour's insolation that the part acted upon by the light is greatly altered, but principally in the wet stuff. If this portion be kept in darkness and freely exposed to the air, the alteration will be seen to continue, and augment from day to day as long as the acquired activity endures, ending by its being completely carbonised, and assuming a very deep brown tint; the parts protected from the contact of the light by the screen preserve their tenacity.

The colouring which stuffs impregnated with salts of uranium assume under the influence of light is always stronger when these stuffs are wet than when they are dry, and it is the same with the alteration; the less acid the solution of nitrate of uranium, the more the stuff colours, and the reverse is the case when the acidity is augmented: but the alteration is always in relation to the degree of acidity, or of concentration of the nitrate of uranium solution.

However, the alteration of the stuff impregnated with a salt of uranium does not depend exclusively on the acidity of the solutions; in fact, after I had rendered the solutions almost neutral, by dissolving therein with heat oxide of uranium until saturated, the alteration was nearly the same; it was stronger, in the same circumstances, when the stuff remained saturated with water during the whole time of insolation.

Comparative experiments have proved that stuffs impregnated with acidulated water, containing 2 per cent. of nitric acid, have been less altered than those which were impregnated with a neutral solution of nitrate of uranium.

Finally, experiments, still comparative, demonstrated that it suffices to insolate for about two hours a tissue of cotton or thread steeped in pure water, for it to be altered in a sensible manner, more especially if the tissue is impregnated with a little soda or potassa. Here is, without doubt, the reason why our linen is so speedily rendered unfit for wear; it would not be the case nearly so soon if it were always dried in the shade, and still less quickly if dried in darkness.

The following experiment has shown how much more rapid the action of the light is on moistened bodies than on dry ones:—Two pieces of cotton, the one wet and the other dry, as I have just now said, insolated, and after the insolation, if a solution of nitrate of silver be poured on them, the silver will be seen to be reduced very rapidly in the insolated part of the wet tissue, while the reduction takes place very slowly and feebly in the insolated part of the dry tissue. But the reduction would be more rapid and stronger if the tissue had been heated to a temperature of 120 to 140 degrees. The same will be the case with a sheet of paper.

Another important fact is, that all the activity acquired by an insolated body is destroyed directly it is employed to reduce the salts of gold and silver. Thus, when a stuff, impregnated with salt of uranium and insolated, has been passed in a solution of gold or silver, in reducing these metals it becomes coloured, but it alters no further, because it has lost all its activity. In further confirmation of this I may state, that a stuff impregnated with nitrate of silver, and insolated under the same conditions as with the nitrate of uranium, does not alter sensibly, while the stuff impregnated with nitrate of uranium is altered very speedily. This difference evidently arises from the former reducing at once the salt of silver in losing its activity, while the second preserves the activity communicated to it by the light. I may observe, with respect to this part of the subject, that if two pieces of cotton, dyed, one with indigo, and the other with prussian blue, are exposed to the light for the same length of time, the first will scarcely be altered either in its colour or tissue, while the second will be greatly altered in every way. The first will hardly reduce the salts of silver, whereas the second will reduce them very strongly. A white cotton tissue would have been more altered than that dyed with indigo, and less than that dyed with prussian blue.

Before terminating I may say that my experiments have demonstrated to me that the different earths, vegetable substances and others, are susceptible of acquiring in a very high degree this activity which the light communicates.

Thus earth taken from a certain depth below the surface, say a yard for example, will make no impression on a sheet of paper prepared with the chloride of silver; but, if a layer of mud formed of this earth be spread on a metal or glass plate, and, after it has become desiccated, it be exposed to the sun, taking care to mask a part with a screen, and afterwards applied on a sheet of sensitive paper, it will be seen that the insolated part acts very strongly on the sensitive paper, while the part screened from the light gives no impression.

Every kind of earth when insolated is capable of acquiring great activity.*

In conclusion, these experiments demonstrate:—

1st. That, for the action of light to take place on organic or inorganic bodies, it is necessary that the substance should be finely divided, and in very thin layers.

2nd. That, for the reduction of a metallic salt, it is necessary that it should be placed in the presence either of an organic substance or of one of these three simple bodies—chlorine, iodine, or bromine.

3rd. That, the organic substance has the same necessity, after having undergone the action of the light, of being placed in the presence of inorganic matter.

[It appears likely that the experiments of M. Niépce may become as interesting to agriculturists as to photographers. We do not profess to be strong on matters pertaining to agriculture, that being a branch of science to which we have paid but little attention. We believe, however, that it is generally supposed that the earth is rendered more fertile by being exposed to contact with the air, while it appears that this increased fertility is owing to the action of the light. The action of the solar rays, too, on tissues impregnated with the nitrate of uranium, as well as on those not so impregnated, both being as it were decayed, is not without importance. As a matter of fact, we believe that housewives have long been aware that the exposure of linen to the air "rots" it, without their knowing that this effect is not produced by the air, but by the light, and more especially by sunlight.—ED.]

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.†

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING.

THE object of the operation designed under this name is to deposit on the fibres of the paper an argentiferous compound susceptible of being afterwards acted upon by solar radiations, so as to constitute the photographic proof.

* I propose to continue my experiments on vegetation and the ripening of fruits, under the influence of the activity acquired by an insolated body. I have already obtained a result on grapes, enclosed in paper bags impregnated with tartaric acid.

† Continued from p. 162.

This is generally effected by placing the sheet of paper on a solution of nitrate of silver, the strength of which, and its composition also, is greatly varied by the manipulator, either intentionally or accidentally.

If in this operation sheets of paper be employed impregnated with an alkaline chloride, as is usually the case, the salt of silver has a double action, one part is converted on contact into an insoluble silver compound, while the other part is imbibed by the porous paper, and remains in the condition of a soluble nitrate, each, it seems probable, acting in different ways.

From this simple proposition there result, as will be seen, several points for examination, some arising from the action of the bath as it has been originally prepared, others arising from the condition of the bath after its composition has been modified by the preparation of papers, either in respect of its neutrality, or of the foreign matters, mineral or organic, that have been introduced.

1. The strength of the silver bath may exercise a direct influence on the production and the value of the proof; besides which, each sheet that is prepared in the bath impoverishes it to a certain extent, and it is thus a matter of some importance to determine this impoverishment, and the action it exercises on the final result.

2. The proof may perhaps be abandoned to the action of the silver bath for variable periods, and these variations may cause differences in the result.

3. The photographic operations lead to important changes in the condition of the bath. It may become either acid or alkaline, and under certain conditions may become ammoniacal. Looking at it in respect of its neutrality, it is advisable to endeavour to ascertain the influence exercised upon it by the nitrate of silver, according to whether this preparation be employed in a crystalline, white fused, or gray fused condition.

4. The successive double decompositions which take place on contact with the salted papers, add to the silver bath different nitrates, the bases of which are borrowed from the chlorides used in salting the paper, and these different nitrates may perhaps in certain cases influence the definite result.

5. The different organic matters employed in the sizing of the paper, partially dissolving in the silver bath, may alter its purity.

6. Finally, as a general corollary of the preceding statements, it is important to examine the extent of the influence which the different circumstances we have enumerated have on the preservation or the alteration of the sensitised papers.

Of the influence of the strength of the bath.—If a sheet of paper be taken that has been salted in a solution containing five per cent. of salt, and divided into four parts, and left for the same period (five minutes), the first in a silver bath of 24 per cent., the second in a bath of 18 per cent., the third in a bath of 12 per cent., and the last in a bath of 6 per cent., and all four taken (dry of course) and exposed under the same negative, only a slight difference will be perceived in the rapidity with which they are acted upon. It will be observed, however, that the papers most rich in silver, colour least rapidly. When the insolation has been deemed sufficient, and they have been washed and fixed in a new hyposulphite of soda bath, very sensible differences will be observed in their appearance, especially while they remain in the water. The result is to all appearance the same, whether albumenised paper has been used or not; but it is, perhaps, less marked in the first case.

These differences are of two kinds; they affect the delicacy and colour of the proof. In order to at once place ourselves in a position to examine these differences, we will take the two extreme examples; we will compare the proof coming from the bath at 6 per cent. and that from the bath at 24 per cent. The first is of an almost uniform, dull tint, and of a reddish tone; the other is clearer and fresher, the whites well preserved, and the blacks coming out boldly. Between these two extremes the red tone will be seen to diminish, and the brilliancy to augment by a regular progression in proportion to the augmentation of the strength of the silver bath; thus the proof prepared on the bath at 18 per cent. is superior to that prepared on the bath at 12 per cent., and so on in proportion. The difference between the proof derived from the bath at 18 per cent., and that from the bath at 24 per cent., which is very sensible on its removal from the finishing frame, partly disappears under the action of the hyposulphite; on the other hand those from the 12 per cent. bath are not quite clear enough: we therefore think that the best strength will be 18 per cent.

These results do not arise from a difference of energy in the sensitive composition; for if each piece of paper be left in the printing frame during a period inversely proportionate to its richness of silver, the same differences will still be exhibited, and even in a greater degree.

Thus, then, the strength of the bath exercises a well-marked influence; its augmentation, up to a certain point, adds to the beauty of the proof by giving more sharpness and delicacy to its outlines, while its diminution lends to the equalisation of the tones and a strongly-marked red coloration. These are two distinct results, which we will examine in succession, seeking to establish their causes.

(*To be continued.*)

DRY COLLODION PROCESS ON PAPER.*

BY M. CORBIN.

I NOW proceed to point out the quantities I have adopted, and to give some details as to the operations.

The medium composition of the collodion I have used is as follows:—

Ether	650	parts.
Alcohol	350	"
Gun Cotton	15	"
Iodine...	1¼	"

This is shaken; then allowed to repose a little; then decanted, and filtered through cotton.

It may be convenient to vary the above proportions a little, according to the temperature. Thus, in very hot weather, it may be necessary to augment the proportion of alcohol, in which case it will be requisite to increase the quantity of gun cotton; for I have observed that, the more alcohol the collodion contains, the more difficult its transference from the glass to paper. This difficulty can only be overcome by thickening the collodion by means of gun cotton. In winter, on the contrary, the proportion of both alcohol and gun cotton may be diminished.

It is worthy of remark how small a proportion of iodine is necessary. A larger proportion would give a less sensitive paper; in this sense, that for the same pose it would give more opposition of tones.

The collodion is poured on the glass in the usual manner; and when the ether and the alcohol have sufficiently evaporated, it is nitrated, by immersing it in the following bath:—

Water	100	parts.
Nitrate of silver	1	"
Nitric acid	¼	"

The small proportion of silver in this bath is remarkable. After the lapse of two minutes the glass is withdrawn, and presents a very clear opal tint. If the film of iodide of silver is unequal, and in a pulverulent state over the whole or part of the surface of the collodion, this will be a proof that the collodion film was not sufficiently dry at the period of its immersion in the bath, and the operation must be gone through afresh. The glass being nitrated, it is washed, by immersion for two or three minutes in a dish filled with rain or river water.

On taking it from this dish, it must be washed under a tap; its surface must then be covered with a solution, consisting of 1 part of iodide of potassium in 100 parts of water. The glass being covered in every part, the superfluous portion is drained into the bottle, and the plate again washed under the tap.

* Continued from p. 183.

To facilitate the transfer of the collodion on to the paper, it is advisable to pour on the surface of the glass, water acidulated with one-fifth of its volume of nitric acid. Finish by washing with water under a tap.

Take a sheet of good gelatinised negative paper, a trifle smaller than the glass (the gelatinising of the paper is effected by placing the best side on a lukewarm bath, formed of 6 parts of gelatine to 100 parts of water—the sheet is then suspended to dry), and immerse it in water until well saturated; then place, the gelatine side downwards, on the collodionised glass, taking care not to allow air to remain between the paper and the collodion surface. The enclosed water is expelled by means of a triangular piece of glass passed lightly over the surface of the paper; the edges of the collodion, which extend beyond the paper, are turned over, and the paper and collodion removed together.

The paper, thus collodionised, is laid on a glass, the collodion upwards; the preservative liquid is poured over it, and it is then hung up to dry. To prepare this preservative film, 10 parts of honey or glucose to a little more than 3 of water, and the white of one egg, are placed in a pipkin over a fire; after a short time the mixture is in a liquid state; heat is still applied, until there is an abundant scum formed on its surface; the liquid is then clarified; it is filtered through paper, and preserved in a closed bottle.

Fermented albumen is prepared, by putting in 25 parts of albumen to 1 of honey or glucose. After the expiration of a day or two, carbonic acid will be liberated in abundance, and the albumen will acquire a perfect fluidity.

To prepare the preservative liquid, equal volumes of fermented albumen and syrup of honey or glucose are mixed together, and filtered through paper. This liquid will pass easily through the filter if the albumen has fermented well.

This mixture must not be prepared long beforehand, or in a few days it will begin to ferment, when the sugar will be converted into alcohol, and the albumen be precipitated.

The process is not nearly so complicated in practice as it appears at the first glance. The different washings of which we have spoken occupy but very little time; and the operations in no way differ from those necessitated in the albumenised collodion process on glass, except in the transfer of the collodion to paper, an operation which is very simple in practice.

This process is evidently preferable to that which consists in detaching on paper a negative obtained on collodionised glass, for one has hardly the courage to run the risk of deteriorating a fine negative by transferring it. There is, besides, the advantage of being able to prepare, in one's leisure moments, or to buy ready prepared, a supply of collodionised paper, that may be kept or taken on a journey without the least difficulty.

The operations which remain to be performed, on using the paper, are very simple.

The sensitising is effected by laying the collodionised side of the paper, for twenty or thirty seconds, on a bath prepared as follows:—

Water	100	parts.
Nitrate of silver	5	"
Acetic acid, crystallisable	5	"

If the bath is old and coloured, it should be rendered perfectly colourless by agitation with kaolin. After washing it with river water several times renewed, the paper should be suspended to dry. In drying, it wrinkles a little, but it is easy to get rid of this by passing a slightly warm smoothing iron over it. This wrinkling can be prevented by fastening the four corners to two parallel lines running one under the other. This fastening should be accomplished by means of the little clasps made for that purpose.

The exposure should last from three to five minutes, with a simple object glass of 3 inches diameter, for a view well illuminated.

The development is effected by floating the paper on the surface of a bath of gallic acid, strengthened with new aceto-nitrate of silver.

The fixing is effected with cyanide of potassium or hyposulphite of soda.

It is then washed, and left to dry. Finally, the negative is completed by waxing the non-collodionised side of the paper with white wax, which is spread about by means of a hot iron, and the excess removed between blotting paper.

It is evident, that gelatine being soluble in water at 60 degrees, if the collodionised paper is dipped in a bath of a higher temperature, the sizing will be dissolved, and the collodion detached from the paper. It is necessary, therefore, during the heats of summer, to wait until the evening to perform the operations of sensitising and developing, or else to operate in a cellar. Liquids should be employed that have been cooled by lying in a cool place or in freshly-drawn well water.

An elevated temperature exercises no hurtful action on the dry paper.

THE MOLECULAR ACTION OF CRYSTALLINE PARTICLES.*

BY DR. A. WELLER.

Other polished surfaces may be used instead of the glass plate, and I have formed these images on quartz and agate with the same effect. The difference of crystalline texture exerts no influence, but the images seem to be with more difficulty produced on polished silver and copper than on a vitreous surface. A very slight degree of friction will excite the formation of an image, although a moderate degree of pressure is more favourable. Electricity exerts no influence in the formation of these images. In one experiment, in order to diminish the friction, I adapted two fine wires, of a spiral form, to a battery sufficiently strong to decompose water freely. These wires were moved through the solution in various directions, and the marks of the passage of the two poles became equally apparent without any difference on either side, and when afterwards disconnected from the battery, and used in a similar manner, they produced the same effects. It is remarkable with what fidelity the traces of lines become visible in this manner. Letters thus formed by a pen are much more faithfully rendered than when written on paper with ink, and lines may be formed which are scarcely visible to the naked eye. Microscopic inspection shows this extreme exactness to a much greater degree than could have been anticipated—for we see a simple line become, as it were, decomposed into a number of parallel lines, which represent the point of contact between two solids. These lines are composed of very minute and confused crystals, of an irregular appearance, and joined together. Their diameter varies from 0·02 of a millimètre to about double that size. Between these parallel lines are frequently seen others still more minute. The other crystals which become deposited by the common crystalline power over the untouched parts of the glass are much larger than either of these. When the point of intersection of two lines is examined under the microscope, we perceive the appearance represented. While crystalline masses are in process of formation, it is impossible to prevent the deposition of crystals on other parts of the glass, but if while these are fresh they are subjected to a sharp current of water, the irregular crystals are mostly carried away, while the images are left almost intact. It is, therefore, evident that the same power which causes this deposit renders them more adherent to the surface of the glass than the other crystals. Another mode of demonstrating the difference of their adherence is by allowing the solution to dry on the glass, when, by brushing it slightly with the feather of a pen, most of the irregular crystals are taken off and the images remain.

Other substances are capable of forming a like deposit. Chloride of platinum and nitrate of potash, mixed together, form a double chloride, with which images can be obtained with as much ease as with the double phosphate. The only difference is that the double chloride precipitates in the shape

* Continued from page 184.

of octahedrons, &c. Solutions of tartaric acid and nitrate of potash deposit crystals of bitartrate of potash, which are capable of forming upper and lower images with nearly as much facility as the double phosphate. The lower images formed by the bitartrate differ in one respect from those by the phosphate, for shortly after their formation they appear to lose their adhesion to the glass, and the slightest agitation of the liquid causes them to be detached; and if a sentence has been written, the curious appearance is presented of fragments of words and letters floating about in confusion. Under the microscope, also, they differ; fewer parallel lines are perceived, and the crystals are larger and unequal in size. Liquor potassæ, added to a solution of tartaric acid, will form images similar to that just mentioned. Caustic soda and tartaric acid produce the same result, but the solution must be much more concentrated.

Images formed by gaseous bodies.—These traces are formed in the same manner as those which are crystalline, by passing a solid body over a piece of glass covered with a liquid containing a gas in solution, when they are immediately perceived by the bubbles which are deposited. On account of the specific gravity of the gas, these images are not very durable, for after a short time, the gas which composes them arises to the surface. As a general rule, the ingredients, whose combination causes the formation of gas, should be added together gently, and so diluted, that whatever gases are formed they remain dissolved in the liquid. I have been surprised to find how much gas may be in this way made to remain in solution; and as most of them appear capable of being dissolved in this unstable manner, traces may be obtained from them all, and I have ascertained by experiment, that such is the case with carbonic, acetic, and hydrochloric acids. To obtain carbonic acid, I have generally used subcarbonate of soda and tartaric acid. Acetate of ammonia was employed to liberate acetic acid, and hydrochloric acid was obtained from common salt and sulphuric acid. A mixture capable of forming traces has the property of disengaging its gas in bubbles whenever it is brought in contact with any dry surface; as, for instance, when a mixture of this sort, formed on a slip of glass, is caused to spread over a part of the surface which has not previously been wetted, bubbles of gas are immediately evolved on that spot, although none are perceived elsewhere. This effect is also produced with champagne, seltzer, and other effervescing waters, which, however, have not the property of forming gaseous traces. Any surface, whether metallic or non-metallic, will be found to effect the separation of the gas from the liquid, and I have not perceived that there was any difference from the surface being perfectly polished or rough.

(To be continued.)

APPROACHING PHOTOGRAPHIC EXHIBITIONS.

NO. III.

Under this heading we have from time to time acquainted our readers with the progress made in the formation and collection of the various Exhibitions. Already the Architectural Photographic Association have opened their Exhibition, in the Rooms of the old Society of Water Colour Artists; for an account of which we refer our readers elsewhere.

It will be recollected that, on previous occasions when we have alluded to "Approaching Exhibitions," we have thrown out hints, and commented on the best mode of furthering their interests. In some quarters these suggestions were at once seen to be practicable and sensible, and were accordingly acted upon. In one, however, our comments upon this the strangest of resolutions seemed only to have a tendency to confirm, rather than to relax, a stringency which was so fraught with danger. We need hardly say that we refer to the resolution which the Council of the Photographic Society passed, in August, to the effect—"That no Photographs would be admitted that had been exposed in shop windows, or otherwise publicly exhibited in this country."

On that occasion we called the attention of the Council to the matter, and said—"The Council have passed a resolution which has astonished not only us, but many others. . . . . . We are sure that, if they will only reconsider the subject, they will see that there has been a *degree of precipitancy in passing the resolution, which will not stand the test of deliberation.*" We then proceeded to say that we had received remonstrances on the subject, and that "the resolution could excite but one feeling—that of disapproval; that it seemed to us, indeed, to be a most resolute attempt to defeat the object of Exhibitions, because it would easily be seen that to exclude a photograph from an Exhibition simply because it had been exhibited in the shop windows, was a most arbitrary regulation, since many of our leading photographers had their respective publishers, and it was not likely that a publisher would so far forget his own interest as to withhold the publication of a photograph until it had been exhibited at the Society's Exhibition." We feel it due to ourselves to re-copy what we had urged so far back as October the 4th, in order to show that we were anxious that the Society should not suffer on account of a stupid resolution, and that the error should be rectified ere it was too late. The result of our remonstrance was a modification of the original resolution, stating that pictures exhibited at the Edinburgh Exhibition would be admitted. This we deemed insufficient, and again we urged a reconsideration of the subject, asking for either a rescinding of the resolution, or a very great modification of it. The Council, however, persisted in their resolution, on the plea that the step which they had taken was one "which was conservative of the dignity and professional interest of the photographer." We clearly showed the fallacy of this argument in a former number, but apparently to no purpose.

What now is the result? At the last moment they find things taking a turn which is *not* "promotive of the Society's interest," and, just as we had predicted, contributions are not found to flow in; the consequence is, that the Council have just rescinded the resolution as far as regards the present Exhibition, and we strongly suspect in regard to *future* Exhibitions also. It is, however, now too late to remedy the evil; already the schedules have been issued with the fatal resolve, and the hanging committee, panic-stricken, are running hither and thither, bearing for their motto, "The smallest donations thankfully received." It remains to be seen who has most at heart the Society's welfare—the "Photographic News," or its own Council? Indeed, by the insertion of this notice, we are doing more to destroy the ill effects of the resolution, than could possibly be done by any other means. We fear, however, that even the publicity of the enormous circulation of the "Photographic News" will hardly save the Society now from the prejudicial effects of this ill-advised resolution. We have, however, done our best, and if the collection of photographs at the next Exhibition of the Society be poor and scanty, the public will not have much difficulty in finding out the parties really in fault.

Critical Notices.

EXHIBITION OF THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.*

The series of Venetian views, by Cimetta, is interesting on account of the associations connected with that city. We are not inclined to go into such ecstasies as some of our contemporaries have done on the subject of these photographs. We are inclined to look at them more from the photographic point of view, and to examine the pictures apart from their historical associations. There is a good deal of *breadth* in the style in which they are taken, and also great depth of colour. In fact, that is one of the drawbacks of the series. They are mostly printed too dark; this, of course, tends to destroy the detail

* Continued from page 186.

which would otherwise be observable. Anybody acquainted with the peculiarities of Venetian architecture, will know that it is full of elaborate and intricate detail, to which photography alone can do justice. These views are larger than any before published of Venice. We recollect seeing a series executed by Perini, not quite so large as the views of Cimetta, but far exceeding the latter in equality of tint, in half-tone and minuteness.

"The Palazzo Pasai" (121) is wanting in clear definition, and there is scarcely any detail to be found in it. "The Bronze Gates of the Logetta of the Campanile of St. Mark" (123), is a subject well adapted to the massive character of these photographs, and the deep brown tone, which is unsuitable to many of these pictures, is singularly well suited to the subject. The elaborate ornamentation is heavy and massive, therefore no great delicacy of tint is desirable. Altogether this is about one of the most effective of these photographs—though we cannot help thinking that still greater effect would be perceptible if it were printed a little lighter so as to show the more minute detail. "The Canopy over the Door of Stephen's Church" (128), would, if well photographed, make a very good picture; it is, however, far from being successful. "The Bridge of the Rialto" (129), is an interesting subject, but it has been taken before by other artists with so much greater felicity, that we are almost astonished to find that it has a place in the collection. "The Railway Bridge, St. Stephen's" (130), has much of the characteristic haziness of these photographs, and the blurred prows of the gondolas have a somewhat ridiculous effect. One thing which must particularly strike every person who inspects these pictures is, that photography cannot give anything like an adequate representation of water. This, no doubt, is one of the causes of the inferiority of these pictures, but it is more particularly noticeable in this piece. "The Sitting Lion at the Arsenal" (131), is a massive picture of a massive subject. "The Chiesa della Saluto" (132), has always been a favourite subject with artists and photographers. When we recollect some pictures by Canaletto, and those more recently executed by E. W. Cooke, R.A., or the photographs by Perini, we need hardly say that we are dissatisfied with the photograph exhibited here. "The Bronze Horses, St. Mark's" (133), "The Recumbent Lion at the Arsenal" (135), are similar in character to (131). They would have been much better if printed less darkly. The object of the photographer in these pictures has evidently been to obtain a true picture of the leading objects, quite unmindful of the general effect; for, had he paid but common attention, he could with a little extra trouble have introduced much detail that could not have failed to be interesting. "The Logetta of the Campanile" (137) is a subject well adapted for fine effect; but here the pervading want of detail is painfully to be observed. For instance—the Bronze Gates, which form the exclusive subject of No. 123, are here very indistinct, while the bas-relief figures in the niches are scarcely discernible. Architecturally speaking, this picture is the most interesting of the series: yet the very defects pointed out are those most necessary to assist the architectural student in his studies. "The Bridge of Sighs" (144) is a wretched attempt at one of the most popular views of Venice. It has neither artistic feeling, light or shade, or anything that could recommend it, artistically or photographically.

It will be needless to mention the remaining pictures of this series: as we should only have to repeat our criticisms. The prevailing faults of Cimetta's series are, that they are printed too darkly; and the artist has evidently endeavoured to give quantity instead of quality. The views are too large; had they been smaller they would certainly have been more effective. Of one thing there can be no doubt, and that is, that Venice deserves a much better photographic translation than that given by Cimetta.

We come next to two small London views, by A. J. Melhuish, of Blackheath, and how strongly do these clear and definite pictures contrast with those just noticed. These are—"View from Victoria-street, Westminster, showing the Towers of Westminster Abbey" (155); "Victoria Tower, Westminster" (156). We are sorry that Mr. Melhuish has only contributed two such small pictures to the present collection. He is an artist calculated to increase the reputation of the association by his good pictures. He is always happy in the clearness of his photographs, and is generally successful in importing atmospheric effect into them. These views ought to have been taken on a scale and in a style commensurate with their importance.

(*To be continued.*)

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

Second Colouring.—By colouring first, and then varnishing, several advantages have been gained. In the first place, the chief disadvantage of dry colours—their tendency to fade—has been to a large extent obviated; and in the next place they have, by combination with a transparent vehicle, lost whatever of opacity pertained to them. They have now, in fact, acquired something of the permanency and transparency of oil colours. But what they have gained in transparency they have lost in intensity, and to produce perfect results a second colouring is necessary. The combination effected between the varnish and the colour already applied, gives a biting surface on which any amount of force and brilliancy may be obtained. This circumstance, however, renders imperative the greatest possible care in applying the second colour, otherwise the delicate half-tones are easily obscured, and the beauty of the picture seriously marred.

Commence again with the face, and proceed as in the first instance, using throughout nearly the same tints, but of just such intensity as they are intended to possess in the finished picture, as no further modification is to take place, except what may arise out of judicious contrast in the colouring of the draperies and background. A pure delicate tint, similar to that we have described as No. 1 flesh, may be freely applied to the highest lights; now use the local colour, blending it with the lights and softening into the shadows of the face, the deepest of which may frequently, in the second colouring, be left untouched with advantage. If the first colouring has been judiciously managed, and has, after varnishing, left the shadows of a suitable and harmonising tint, they will, by being left untouched in the second colouring, retain their transparency, and add much to the depth and vigour of the picture. If they require touching to make them accord in tone with the newly-applied colour, a very delicate touch of the proper tint will suffice. Remember that beauty of colour will not compensate for the loss of the proper relations of light and shadow. Heighten the cheek with carmine, or carmine and rose, taking care to diffuse the colour naturally, preserving in this respect the characteristics of the sitter, and blending the carmine with the local colour. Touch the lower lip with carmine, taking especial care not to obscure its form, and to avoid touching the shadow which divides the lips. The upper lip, being in shadow, will rarely require any brighter tint than that it has already obtained in the first colouring.

The eyes, if a bright blue, will probably require touching again with the suitable tint. The corner of the eye, next the nose, may be touched with carmine. The eyebrows, if light, will probably require intensifying.

Examine the hair to ascertain if the varnishing has left it of the right tint, if not, add a little colour to the lights only.

The hands, neck, &c. may now be re-coloured, keeping them as delicate as may be compatible with the colour of the model. Remember that in this matter any deviation from nature, if it be in the direction of coarseness, is altogether unpardonable; whilst on the other hand, a little increased refinement will rarely be censured.

Proceed now to the draperies, and recolour them, if necessary, using the same care to obtain brilliancy in the high lights, and to preserve transparency in the shadows, as in the first colouring. The draperies in portraits of gentlemen rarely require any colour, except in uniforms, in which case they also generally require to be non-inverted. The best method of colouring these we shall describe in a future article. In colouring draperies, it will often happen that a certain amount of discretionary power is left with the artist, of which he will avail himself to use such tints as best harmonise with the complexion of the sitter, and give due value to the flesh tints; for it is in giving life, character, and beauty to the head that the chief attention of the colorist should be devoted, all other points being more or less subser-

vient to this object. It is very easy to completely spoil the flesh tints, and kill the whole colouring of the head, by an injudicious choice of surrounding colours. As a rule, masses of positive colour should be avoided in the draperies, keeping them judiciously subdued. Of backgrounds we shall speak in detail; and of the general principles on which harmonious colouring is based, we must treat in some distinct articles.

White lace, where it requires it, may be touched with Chinese white; but as we have said before, the less water colour used the better. Flowers may also at times be made effective by water colours, or, better still, by oil colours. Jewellery is often touched with the gold shell, but, unless carefully managed, it has a coarse, bedizened effect. We prefer water or oil colours if skilfully done, using orange chrome and burnt sienna for the shadows, and Naples yellow for the lights.

(*To be continued.*)

Photographic Chemistry.

ORGANIC CHEMISTRY—(*continued*).

Cellulose or Cellular Tissue.—The tissue of vegetables, of whatever kind they may be, is composed of elongated and parallel cells, formed of a substance, to which the name of cellular tissue has been given, and of a hard matter, termed ligneous tissue, which exists in the cells in greater or less proportions, according to the hardness of the vegetable. Cotton is formed almost wholly of cellulose; the wood of the oak is composed of cellulose and a large proportion of ligneous matter. The chemical composition of cellulose is always the same, and may be represented by $C_{12}\ H_{10}\ O_{10}$. Well manufactured and good paper may be considered as being composed almost entirely of cellulose—the rags from which it is made being scrupulously washed to free them from impurities of every description, and undergoing very numerous washings in the course of its conversion into pulp, and bleached by chemical re-agents. Cellulose may be obtained from all vegetable tissues. Thus, we have seen paper manufactured from the fibre of the cabbage-stump, from the fibre in the liquid manure of dairies, and from other substances equally unsavoury, and where the presence of cellulose, to most people, would be equally unsuspected.

If highly-concentrated nitric acid, or a mixture of nitric and sulphuric acid, or a mixture of nitrate of potassa and sulphuric acid, be made to react on the fibre, divers substances are obtained of an exceedingly inflammable nature; that prepared with carded cotton has been termed *gun cotton* or *pyroxyline*. Gun cotton dissolves with facility in a mixture of ether and alcohol, and forms the basis of collodion.

Starch is a white granular matter, which is found in the cells of almost all vegetables, whether they are cereal, tuberculous, or bulbous roots. The amylaceous product of the cereals has more especially the name of starch—that of potatoes being usually termed fecula. This body, whether it is termed starch or fecula, is a substance, the composition of which is identical with that of cellulose: its formula is the same, viz., $C_{12}\ H_{10}\ O_{10}$. Its presence may be detected by the blue tint communicated to any substance containing it by a solution of iodine.

Dextrine has the same formula as cellulose—$C_{12}\ H_{10}\ O_{10}$. Starch swells in water, but does not completely dissolve; if it is slightly torrefied, or if it be heated with very dilute acids, it becomes perfectly soluble, but is no longer the same substance; it is not starch, but a new body, to which the name of *dextrine* is given. It is extensively used as a substitute for gum arabic.

Glucose—the formula of which differs slightly from the preceding, being thus written, $C_{12}\ H_{14}\ O_{14}$—is obtained by a prolonged action of acids on starch; or otherwise, from the conversion, by fermentation, of the starch contained in barley into a peculiar kind of sugar, to which the name of *glucose* has been applied.

Pure sugars are substances perfectly neutral to red and blue litmus papers, and soluble in water. They can, under the influence of fermentation, be converted into alcohol and carbonic acid, but not without the addition of a ferment, as a solution of perfectly pure sugar does not contain in itself the element necessary to produce this action, although a solution of impure sugar does. Sugars are of different natures. There is a difference between the sugar obtained from the cane or the beetroot, the glucose of which we were just now speaking, the sugar of milk, &c. To place this part of our subject in a clear and precise form, we may say:—

Cane or beetroot sugar, $C_{12}\ H_{11}\ O_{11}$, is prepared by purifying and concentrating the juices of those vegetables.

Glucose, $C_{12}\ H_{14}\ O_{14}$ is extracted from the juice of acid fruits by concentration; or prepared by heating starch with acids; or from carefully malted barley.

Sugar of milk, $C_{24}\ H_{24}\ O_{24}$, is obtained by evaporation of whey.

These sugars are easily distinguished from each other. The sugar of the cane or beetroot crystallises easily, and forms sugar-candy; on the contrary, it is very difficult to crystallise glucose. Both of these have a more distinct sugary taste than the sugar of milk.

Glucose and the sugar of milk decolorise, when hot, an alkaline solution of tartrate of copper, and produce therein a yellow precipitate of protoxide of copper; pure cane sugar has no action on this liquid.

We may add that all sugars reduce the salts of silver.

(*To be continued.*)

Dictionary of Photography.

AFFINITY (*continued*).—2. Another modification is caused by the *bulk* of the substances which react on each other in this way, and arises from the circumstance, that a very large quantity of a substance possessing a less degree of chemical affinity, is capable of overcoming the stronger chemical affinity of a smaller amount of another substance; or, in other words, and in more exact language, *quantity* is capable of sometimes making up for insufficiency of force. This rule, however, has many striking exceptions.

3. The differences of cohesion between bodies is another source of modifications. This is apparent, either when the tendency of a body to assume the solid or gaseous state is of itself sufficient to overcome all other kinds of affinity, or when another, weaker affinity, is added to this tendency, both unite in overcoming the more energetic affinity of bodies which, under other circumstances, would have remained in the liquid state.

For example—Carbonic acid is one of those which is most easily disengaged from its combinations with other bodies. This phenomenon does not only take place on account of its having a less powerful chemical affinity than most other acids, but because it has so great a tendency to become gaseous, that, however small the quantity of it which is expelled from its combinations, it immediately escapes in the form of a gas, so that it cannot accumulate in sufficient quantity to act by virtue of its mass.

4. Finally, the usual form of chemical affinity is further modified when several bodies are mixed together which are capable of reacting on each other. For instance—When two salts, such as chloride of potassium and sulphate of ammonia, are mixed together in solution, the composition of each undergoes a change, so that the strongest acid goes to the strongest base, and the other acid and base likewise unite, thus forming, in the case under consideration, sulphate of potassa and chloride of ammonium. It is hardly necessary to remind our readers that if these two latter salts had been mixed together no change would have taken place. This modification of chemical affinity has received the name of double affinity; and the change which takes place through its action is called double decomposition.

ALBUMEN.—Albumen is a body which is of very general occurrence in the vegetal kingdom; it exists in plants either in a coagulated state in their tissues, or in solution in the liquids which circulate therein. Albumen is also found in great quantities in the animal economy; the serum of blood and the white of an egg are essentially composed of albumen dissolved in water. Animal albumen appears to be identical in its composition and chemical properties with vegetable albumen, and many physiologists admit that this substance is furnished immediately to animals from the vegetables on which they feed. Albumen exists in two distinct states—*soluble* and *coagulated;* in each of these states it possesses, however, the same chemical composition. A good idea can be obtained of these two states by comparing the albumen of the white of an egg in the raw state with the same cooked. The albumen from the white of the hen's egg *(ovalbumen)* being that with which photographers are mostly concerned, we will confine our remarks to the characteristics of that body. *Soluble* albumen dissolved in water is a glairy, inodorous, tasteless liquid, of a colour varying between the palest yellow and perfectly colourless. It coagulates at a temperature of about 140°; but if kept exposed to the air at a lower temperature than about 120°, it may be dried up, when it forms a transparent gummy mass, which, however, will never perfectly dissolve again in water.

(To be continued.)

A Catechism of Photography.

GELATINE PAPER.

Q. Is not gelatine occasionally employed in photographic operations?

A. It is used in a similar manner to the albumen. Take about half an ounce of pure white gelatine and add to it 16 ounces of distilled water; when the gelatine is melted, add 75 grains of iodide of potassium—rapidly agitating the solution with a glass rod; about 350 grains of the aceto-nitrate composition is then to be added. The liquid so prepared is of a light yellow tint, which colour it retains for some time. When the solution is to be used, it must be placed in a china basin or bath, and the paper, to be prepared, must be allowed to rest six or ten minutes on its surface. The paper so prepared must be hung up to dry, and all the precautions observed which have been noticed in other processes. As soon as the paper is thoroughly dry, it must be immersed, so as to cover both sides in a solution of iodide of potassium and distilled water (15 grains of iodide of potassium to 3 ounces of water); after soaking in this iodide bath for six or eight minutes, the paper may be removed, thoroughly dried, and put away for future use.

THE COLLODION PROCESS.—WET COLLODION.

Q. What is collodion?

A. Collodion is a solution of gun-cotton in ether and alcohol. This solution gives a liquid more or less mucilaginous, which remains upon a piece of glass or other surface, after the evaporation of the ether and alcohol, a pellucid solid, perfectly transparent and homogeneous. It readily incorporates itself with iodide of silver, and thus produces a sensitive coating of extreme delicacy.

Q. With whom originated the idea of employing collodion as a basis of photographic operations?

A. Mr. Archer and Mr. Fry, in England. The discovery was made in the year 1851.

Q. What is the ordinary process for obtaining a picture on a collodion surface?

A. The operation may be thus indicated:—

1. The preparation of the collodion.
2. Cleaning the glass.
3. Application of the collodion to the glass.
4. Sensitising the plate.
5. Exposure in the camera.
6. Development of the image.
7. Fixing.

PREPARATION OF THE COLLODION.

Q. How is collodion prepared for photographic operations?

A. There are several methods adopted, with more or less success, by different photographers. All however agree in their leading features. The following plan is found to produce very good results:—Mix in a wide-mouthed bottle, perfectly clean, and rinsed with pure alcohol—

Rectified sulphuric ether	67 c. c.*
Gun-cotton	16 grains.

Agitate the bottle until the cotton is thoroughly impregnated, and the whole of its fibres separated from each other. Add, in small quantities—

Rectified alcohol	33 c. c.
Iodide of cadmium	16 grains.

The cotton is immediately dissolved, but the solution must continue to be agitated until the whole of the iodide of cadmium is taken up; let it rest, after this, for twelve hours; it may then be decanted into another vessel.

Q. What are then the proportions of the collodion?

A. The collodion contains two-thirds ether, one-third alcohol; and, to 100 centimètre cubes of this mixture, 16 grains of gun-cotton, and 16 grains of iodide of cadmium, are to be added. This preparation will readily adapt itself to the glass plates, and may be spread without much difficulty. Sometimes it will be found necessary to add fluidity to the solution; and, for this purpose, another bottle should always be at hand containing the following mixture:—

Rectified sulphuric ether	90 c. c.
Gun-cotton	2 scruples.
Alcohol	10 c. c.

A little of this preparation effectually clears the collodion, and renders it sufficiently fluid for all practical purposes.

Q. Describe another form of the preparation of collodion.

A. Collodion is sometimes prepared as follows:—

Rectified ether	67 c. c.
Gun-cotton	16 grains.
Alcohol	33 c. c.
Pure iodine	0·6 grains.

And a small quantity of laminated cadmium.

This mixture is to be agitated until the iodine is dissolved; it is then to be exposed to the light, and discoloration allowed to take place; after which, the clear portion of it may be decanted, and reserved for use.

Q. Are not other chemicals sometimes introduced in the preparation of collodion?

A. Some photographers employ soluble bromide of cadmium, ammonium, and potassium, so as to produce a sensitive coating of bromide of silver. The proportion of soluble bromide is generally about one-fourth of the iodide employed. Thus:—

Rectified ether	67 c. c.
Cotton	16 grains.
Alcohol	33 c. c.
Iodide of cadmium	16 grains.
Bromide of cadmium	4 grains.

The addition of the bromide is always useful for landscape or copying, but is not so suitable for taking portraits.

Q. Describe other processes.

A. The following, in which are united three iodides and three bromides, namely, potassium, ammonium, and cadmium, gives a collodion which will keep for a long time:—

Rectified ether	67 c. c.
Gun-cotton	16 grains.
Alcohol	33 c. c.

And

Iodide of potassium	4 grains.
Iodide of ammonium	6 grains.
Iodide of cadmium	6 grains.
Bromide of potassium	1 grain.
Bromide of ammonium	2 grains.
Bromide of cadmium	2 grains.

The iodides and bromides are to be mixed in a mortar of glazed earthenware, and, when properly prepared, they

* Cubic centimètre, 0·001,761 parts of a pint.

are to be added to the collodion; and, after having been thoroughly shaken, should be allowed to remain three or four days before using.

(To be continued.)

Correspondence.

TRANSPARENT ENAMEL PHOTOGRAPHS.

SIR,—In one of your replies to correspondents you express a desire to be furnished with information on the subject of transparent enamel photographs; so, without presuming to instruct one so experienced as yourself in photographic matters, I think I may venture to give you my experience on the subject.

Being daily engaged at Messrs. Horne and Thornthwaite's, I happened to be present when (in the earlier part of 1858) some opal glass plates were offered by Messrs. Chance, Brothers, of Birmingham; the gentlemen offering them could give no information as to their special application, "they were simply for taking photographs upon." The idea, however, immediately presented itself to my mind—that they might be judiciously applied to taking transparencies in imitation of the Swiss porcelain pictures.

I made a few experiments, which so completely convinced me of their suitableness for the purpose above mentioned that I resolved to construct an octagonal lamp, having sides about 8 × 3, with transparencies of such subjects as the Apollo, Belvidere, Canova's Terpsichore, &c., thereon; an argand burner would have shown these up to great advantage, and I should have sent them to the Photographic Exhibition. This *good intention*, however, I regret to state, has only gone to form another paving stone for a locality to which I am sure I need not more particularly allude.

The process is a very simple one:—It is only necessary to procure some opal-flashed glass plates of the desired size, coat with collodion, and sensitise in the usual way, and expose in a copying camera to a good negative; the resulting picture, developed also in the usual way for a negative, will, of course, be a positive, which has the advantage of being so either by reflected or transmitted light; the same result may also be obtained if the plates are prepared by any of the dry processes, and the negative simply obtained by superposition.

The photographs so obtained have a beauty peculiarly their own; the high lights being remarkable for a marble-like whiteness, and the deep shadows beautifully transparent. —I am, sir, yours, &c., JAMES MARTIN.

122, Newgate-street, London, 27th December, 1858.

DEVELOPMENT OF AN IMAGE AFTER FIXING.

DEAR SIR,—In reference to Mr. Sidebotham's letter in vol. i. p. 173, "On the Development of an Image after Fixing," I may mention that some time ago I adopted the plan of *re*-development after fixing. In my early attempts with Fothergill's process I set aside some otherwise good negatives because they were too weak to print well; the simple fact was, that I had not carried the development far enough. Many weeks after I thought of and tried the plan of re-development, using a slightly weaker solution, and with complete success.

While on this subject I may add my testimony to the very practical nature of Fothergill's process. I have scarcely had a single failure, though I have often had to work under disadvantageous circumstances; and this is the thing to test the merits of a process.

In this process, although the prepared plate may appear almost as transparent as glass, any amount of opacity may be attained by carrying the development far enough.—Yours faithfully, ROBT. W. HALL, F.L.S.

Photographic Societies.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

A MEETING of this society was held at the Golf Club House, Blackheath, December 20, 1858, the president, J. GLAISHER, Esq., in the chair. T. Knill and H. Williams, Esqrs., were duly elected members of the society.

Mr. Heisch, V.P., called the attention of the society to the use of metagelatine as a substance for mounting photographs. He stated that it was as strong and good as glue, and had this advantage, that it could be used cold, and dried sufficiently slowly to admit of its being spread upon the largest photograph with the utmost deliberation, which is not the case with glue and other kinds of gelatine, which require to be used hot. Pianoforte makers' glue, converted by sulphuric acid, answers very well, the slight colour being of no importance; for this purpose 1 oz. of glue would make 1 pint of solution. It is best prepared as follows: place 1 oz. of glue in 10 oz. of water to which have been added 40 minims of oil of vitriol, allow it to soak for some hours till the glue is completely swelled, then heat almost to boiling for 2 or 3 hours, saturate the acid with carbonate of lime (common whitening answers very well), and filter hot through coarse blanket paper; when filtered add 2 oz. spirit of wine, and make up the solution to 20 oz., it will now filter through the finest blotting paper at a temperature of about 80°, while at from 60 to 65° it is a very thick syrup, which when applied to paper does not soak in sufficiently to cause the warping of the board on which it was mounted. The solution will keep any time and is always ready for use. The heating of the glue with the acid must not be too prolonged, in fact a small quantity of gelatine must be left unconverted, otherwise the solution remains quite limpid at all temperatures.

Mr. Melhuish exhibited some stereograms he had recently received from F. Haes, Esq. The negatives were taken in intensely hot weather in Cairo, on plates prepared by Dr. Hill Norris before Mr. Haes' departure from England. Mr. Haes stated that the time of exposure was decidedly longer than would be required in England.

Mr. Knill exhibited some large photographs which he has recently brought from Rome, and Mr. James a very beautiful photograph from a drawing.

Miscellaneous.

BLUE OR RED PHOTOGRAPHS.—M. Niépce has added a note to his paper, which we published recently, containing some important details relative to the more easy acquisition of blue or red photographic pictures, in which prussiate of potash is used as the developing agent. After the insolation of paper prepared with prussiate of potash under a negative, a boiling solution previously saturated with bichloride of mercury is then poured upon it, and the picture is allowed to remain in this for two or three minutes, and then rinsed in pure water; after which a boiling solution of quadroxalate of potash, previously saturated cold, is poured on it, when a fine blue colour will be developed with great rapidity, the proof must then be washed in pure water, and it is fixed. To obtain fine pure red tones, paper prepared with nitrate of uranium must be heated to a temperature of about 120 degrees before exposure to the light; its action in this case being more prompt on the prussiate of potash.

THIRD EXPOSITION OF THE FRENCH PHOTOGRAPHIC SOCIETY.—The third Exposition of the French Photographic Society, announced for the month of February, is postponed until April, 1859. Consequently intending exhibitors should send their pictures (carriage paid) by the 15th March at latest, to M. Martin Laulerie, Secretary of the Society, Rue Drouot, 11; who will take charge of them, and forward them to the place selected for the exhibition. Wishing to give to this Exposition all the importance and interest possible, the society invites all photographers, native and foreign, to send pictures, in order to form an Exposition really universal, where the progress made by the art in each country may be appreciated. All works sent will be submitted to the examination of a special jury, who will decide as to their admission. This jury will be named at the next general meeting of the society, and the list published in the next number of the *Bulletin*, with the regulations of the Exposition.

Photographic Notes and Queries.

ILLUMINATED PAPER STEREOGRAMS.

SIR,—"P. H. O.'s" inquires in vol. i. p. 177, "What is the best way to procure the semi-transparent or illuminated stereo. slides on paper?"

Perhaps the following plan would be found useful:—Take a positive of the slide on wet collodion in the camera the same size as the negative; then, when dry and varnished, cover the positive with Archer's transferring varnish (gutta percha dissolved in benzole), warming the glass that the gutta percha may dry transparent. Then cut thin negative paper (avoiding the water mark) larger than the positive, and spread gum evenly over the paper. Then having placed the glass in water till the film is disengaged, turn it over, and let it float perfectly smooth on the surface of the water. Then take a bottle (with a cork in it), and, with a smooth surface (the bottle should be large enough to allow the positive to go round it, and leave a space between the two ends), place the bottle underneath the positive, so that when lifted up from the water it will be rolled quite smooth round the bottle. Then remove the moisture from the positive and the bottle with blotting paper, and carefully place one end of the positive on to the gummed paper, then, by slowly rolling the bottle with slight pressure, the positive will adhere to the paper without the chance of air bubbles, and will have the same side on the paper that was on the glass. The paper when dry, if not considered sufficiently transparent, may be varnished or waxed. The positive may also be coloured on the paper side with transparent colours. The paper must be cut so as to leave a narrow margin round the positive, which must be divided in the centre of the space between the two pictures, that each picture may have a margin round it. They should then be mounted, the left hand picture to the right of the other, on a skeleton mount, that is, the parts where the pictures are to be should be cut out the same size as the pictures, and they should be attached to the edges by gumming the paper margin.

The mount is necessary because the pictures would curl up unless fastened to something rigid. The mount should be rather thick.

I think these transparent collodion positives on paper would be superior to any printed on the paper and varnished or waxed.

Reigate. THOMAS BARRETT.

TONING BATH.

SIR,—The best toning bath I ever met with is composed of

Chloride of gold	1 grain.
Carbonate of soda...	1 drachm.
Citric acid	20 grains.
Water	12 ounces.

Mix and warm till it slightly changes colour; use whilst warm.

The pictures are washed for a few minutes from free nitrate, and then put into the toning bath, care being taken as to bubbles, &c. They are fully toned in about half a minute, or even less. Afterwards they are washed and put into hypo., 4 ounces to a pint, and washed as usual.

Now I find this bath very slow when cold, or an hour or two old. A day old, it is quite useless, even when warmed up. Is there a remedy for this? or must it be thrown away, and a fresh bath made? Can gold be added to it with advantage? I find that this addition does *not* improve it in any way. S. S. B.

[The bath can only be used when freshly made, as the citrate of soda gradually re-acts on the chloride of gold, and reduces it, consequently a very little should be used at a time. A good plan will be to dissolve the chloride of gold in half of the water, and, the other substances in the remainder, and mix together, in equal proportions, just enough for present use.]

SELF-ACTING LEVELLING STAND.

DEAR SIR,—Will you suggest to the makers of photographic apparatus that they may supply a want (and, what is more to the purpose, put something in their own pockets) by making a self-acting levelling stand. I mean a triangle with three points as usual on which to support the plate, but resting on a pivot in the centre, and connected with a heavy bob underneath, not heavier, however, than is necessary. This might be done in the space occupied by an ordinary stand.

When working inside a carriage the usual stand is put out of level every time the horse shakes his head or wags his tail—which occurs every ten seconds in hot weather; and it is very provoking to find, when working a large plate, that all the pyrogallic is tilted over one corner before one has time to stop it.

Something of the kind was introduced two or three years ago, but it was for a different purpose, and was too clumsy ever to come much into use.—Yours truly,

W. R. SEDGFIELD.

STEREOSCOPIC CAMERA.

SIR,—I may take the opportunity to describe an impromptu stereoscopic camera, to the "invention" of which I was driven by necessity." Being desirous of taking some double pictures, and having nothing but the ordinary camera with me, it occurred to me that as my slide had no lateral motion, the only alternative was to put one to my lens. For this purpose I cut a slit in the front of my camera; overlapping this, and running in a groove, I placed a slide, in the centre of which I screwed my lens. It thus moved freely from side to side. By sawing through the centre of the sliding shutter of the camera, I was enabled to take both pictures alternately upon the same plate, shifting the lens right and left as required.

I would suggest that this arrangement might be advantageously applied to the ordinary stereoscopic camera. By its use but one lateral movement is required; thus doing away with the necessity of shifting-tables, or any other arrangement—except the twin lenses for taking double pictures.

Bayswater. H. T. T.

FOTHERGILL'S PROCESS.

SIR,—I am rather surprised at the statement of Mr. Nicol as to the wonderfully rapid pictures he has obtained by the above process, viz., with a 7-inch focus lens, $\frac{4}{16}$ stop, 40 seconds' exposure, 5 weeks old, &c. Now, I have tried with a very similar mixture of albumen—but, although it was beaten to a froth, it did not obtain a negative, with a $4\frac{1}{2}$-inch focus lens, $\frac{1}{4}$ stop, in bright sunlight, in less than 3 minutes; and several friends have found even 9 minutes not too long. Perhaps it may be urged that my collodion must be slow. I think not: 10 seconds will be sufficient time with the above stop to get a good negative. So I fancy Mr. Nicol must have made a mistake; for the collodion I use is nearly similar in ingredients to that mentioned by him, with this difference in my favour—I use 5 ether, alcohol 3, which increases the rapidity by 1, making the collodion more powdery. ONE OF DEVON.

VIGNETTE GLASS.

SIR,—* * * * asks for a simple method of making a vignette glass. The only one of any real value is that of taking a mat of the required shape, and laying it on to a piece of cardboard the size of the printing frame; cut out the cardboard to the shape of the mat, place the negative and paper in the frame as usual, then on the glass of the frame (outside) affix the cardboard, placing the hole over the portrait, first placing a little cotton wool round the edge of the hole; affix cardboard to the frame by pins, &c.

W. H. W.

TO CONVERT A POSITIVE INTO A NEGATIVE.

Sir,—Perhaps the following will be worth the attention of some of your readers:—To turn a *positive* into a *negative*, prepare the plate, and expose as for a *positive*; develop with photosulphate of iron, and wash clean; again pour over the plate some *pyrogallic acid developing solution*; wash, &c. as for a *negative*, which you will see you have got.

C. F. B.

SYNOPSIS OF PHOTOGRAPHIC PROCESSES.—WET COLLODION POSITIVES.

Clean plates.
Coat with collodion.
Immerse in bath in same way as negative.
Place in slide.
Expose.
Develop (3″ to 10″).
Wash directly.
Fix.
Wash well.
Dry.
Varnish.

Developing solution:—

Protosulphate of iron	12 grains.
Acetic acid	15 minims.
Alcohol	10 „
Water	1 ounce.

4 drachms for a plate of 20 square inches.

Fixing solution:—

Cyanide of potassium	10 grains.
Water	1 ounce.

H. S. I.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not believe all that inventors state about the perfection of their processes.

Do not store sensitive dry plates in deal boxes.

Do not allow the distance between the sitter and camera to be less than 6 feet.

Do not tilt the camera upwards, but always keep it horizontal.

Do not plant the legs of the camera-stand too close together.

Do not fix collodion negatives with cyanide of potassium, in preference to hyposulphite of soda.

ANSWERS TO MINOR QUERIES.

Transparent Glass Stereograms.—*Millet.* Very excellent transparent glass stereograms have been taken by us in the following way some years ago:—Coat a glass plate with collodion uniodised, but containing the same quantity of alcohol as if the iodising solution had been added to it. When it has set, immerse in a dish of clean water, and after allowing it to remain there for five or ten minutes, remove it; and after washing it slightly in fresh water, rest it against a wall, on blotting paper, to drain. After the plates have drained for a few minutes, but are still wet on the surface, pour over once or twice the following mixture:—

Albumen	10 ounces.
Common salt	100 grains.

(This must have been previously beaten up to a froth, allowed to settle, and then filtered.) Then rest them up against a wall, on blotting paper, to dry: they will keep in a dry place for months. When required to be used, dip into a bath containing 30 grains of nitrate of silver to the ounce of water, drain, and dry in the dark. Expose under a negative in a pressure frame to the full rays of the sun until strongly printed; proceed in the subsequent operations as if the picture were an albumenised paper positive, employing the same toning and fixing baths.

Saturated Solution of Gallic Acid.—*R. T. P.* Your solution of gallic acid has not been anything like saturated, if prepared merely by placing an excess of gallic acid in water, shaking up for five minutes, and then filtering. The way you must do is to place about half an ounce into a stoppered bottle, holding about a quart, and then to completely fill it with distilled water. Prepare it, if possible, some days before requiring to use it, shaking it up now and then; by the end of this time it will be really a saturated solution, and will have great developing energy in the calotype process. When required for use, filter off as much as is wanted, and fill up the bottle with fresh water. It will be as well, also, in order to guard against the ingress of air, to let the bottle stand upside down, resting on the stopper, in a corner. It will thus keep good for months.

To Dry Gun-cotton rapidly.—*Pyro.* Do not attempt to dry your gun-cotton rapidly before a fire, but proceed in the following way:—After washing, place it in the folds of a clean cloth, and wring it out as dry as possible; then place the cotton in alcohol, loosen the fibres by stirring with a glass rod; then take it out, press the alcohol from it, wring it out as dry as possible in a cloth, and pick it quite loose, in a few minutes it will be quite dry. An enterprising American has taken out a patent for the above.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Norma.—If you use fused nitrate of silver, it should be faintly acidulated with acetic acid. Good crystallised nitrate will, however, do very well for positive printing. We have had no experience in the "new process" mentioned by our contemporary. The paper you allude to is very good, but we do not know what are its special advantages.

H. S. I.—1. Your best plan for obtaining reduced photographs of maps, &c., will be to use wet collodion; a single lens, stopped down by means of a ¼-inch diaphragm in front of it; and to have the sun shining on to the map. 2. Water colours; but only those which dry transparent. 3. One part of hydrochloric acid and four of water, rubbed on with finely powdered bath brick and a piece of flannel; when bright, wash with plenty of water.

Y. Z.—Marine glue is the best cement we know of for fastening glass. Perhaps some correspondents would favour us with their experience on this point, as ours has been rather limited?

B. D.—Your best plan will be to consult some photographic friend who will take the trouble to test your bath. With the slight knowledge of photography which you possess, you have acted rashly in adding so many chemicals to your bath; still, we would not advise you to discard it until some experienced hand has tried whether it cannot be brought again into working order.

W. A. M.—The law of artistic copyright is at present in a very vague state, but we are decidedly of opinion that, were you to sell photographic impressions of copyright engravings, you would render yourself liable to legal proceedings for infringement of copyright.

G. W. H.—With ordinary caution the vapour of chloroform, which would be inhaled whilst using it to take off the black varnish from a glass positive, would not be injurious.

A. Bremenium.—The effect you mention is produced by *hot pressing*, this you can have done for you by sending the pictures to a wholesale stationer or copper-plate printer. We prefer starch paste for mounting stereograms. Your first production is very creditable.

S. Taylor.—We hope soon to be able to give some further information on the subject of your letter.

Iron has a large quantity of pure protosulphate of iron which he wishes to dispose of. He had better apply to one of the photographic chemists whose addresses will be found in our advertising pages.

J. Paterson.—All that is known of importance respecting the employment of nitrate of uranium for photographic purposes will be found in the "Photographic News." We do not think the print you mention was taken by its means.

A. Burton.—Your first question has been already answered in full. Would it not be as well to *try* if your bath be injured before asking for a remedy?

H. & J.—Filter the bath and add a few drops of acetic acid.

G. H.—An ordinary anachromatic glass similar to a spectacle lens is what is referred to. The telescope described has no pretensions to merit beyond cheapness.

Communications declined with thanks:—J. M.—P. W. W.—G. A. H.—Hawker.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—R. C. B.—W. H.—J. M.—F. B.—Alice.—An Old Stager.—B. O. O.—Xmas.—T. N.—P. A. L.—X. Y. Z.—W. C.

In Type:—J. T.—Norma.—H. C. J.—T. W.—Viator.—An Amateur.—Gwenthlian.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 18.—*January* 7, 1859.

SUGGESTIONS FOR THE EMPLOYMENT OF GELATINE PAPER IN PHOTOGRAPHY.

Now that attention is being drawn in the photographic world to the employment of other transparent media than glass for the purpose of acting as a support for the collodion film, we would draw attention to the substance known in commerce as gelatine paper, as possessing qualities of transparency, flexibility, and toughness, which cannot fail to recommend it to all photographers. Its general employment was suggested by H. Dobell, Esq., in a paper communicated to the Royal Society, and it is from the proceedings of that body that we have made the following extracts. The author has pointed out several very useful applications of this substance, but has omitted all remarks as to its applicability to photography; its employment, however, in the various branches of our art is so obvious that it would be superfluous for us to do more than mention its many good qualities to our readers.

The object of the communication is threefold:—

1. To point out the properties of a material called gelatine paper, which render it applicable as a medium for colouring light.

2. Through the means of gelatine paper to introduce the use of coloured light in the arts for the preservation of the sight of artisans.

3. To introduce the use of gelatine paper for the relief of persons suffering from impaired vision; for the preservation of the sight of travellers, and of all those who are much engaged in reading.

This material was invented in 1829 by the late M. Grenet, of Rouen, and was exhibited by him in its present state of perfection in the Great Exhibition of 1851. But up to the present time it has not been successfully applied to any more useful purposes than the manufacture of artificial flowers, address-cards, tracing paper, wafers, wrappers of confectionery, and the like.

It is commonly manufactured in sheets, measuring 22 inches in length, and 16 inches in diameter, which are sold at a low price; but the sheets can as easily be made of any dimensions not exceeding those of which plate-glass is capable. It can be made of any thickness, from that of the finest tissue paper upwards. It may be obtained as transparent as the best glass, and more free from colour, or from all colours and shades of colour, without interfering with its transparency. It is exceedingly light, and may be bent or rolled up without injury. It can be cut with scissors like ordinary paper, and may easily be stitched with a needle and thread. By means of an aqueous solution of gelatine, it can be made to adhere accurately to plates of glass without any interference with its transparency. When varnished with collodion it becomes perfectly waterproof, more pliable, capable of bearing a considerable degree of heat without injury, and its transparency is not affected. Such being the properties of the material, the following are enumerated by the author as some of the forms in which he suggests that it may be employed, and in which it has already been found useful.

1. A small sheet of very pale green or blue gelatine paper, to be used in reading. The sheet is simply to be laid upon the page of the book, and the reading to be conducted through the coloured medium. If used in a faint light, the reading paper is to be removed a little from the book to admit more light beneath it.

2. A sheet of gelatine paper of pale green set in a light frame, and placed like a screen before the window or lamp of the engraver, the watchmaker, the jeweller, and the like; thus providing a light of genial colour, in which they may pursue their occupations.

3. A similar appliance to the last mentioned for the use of needlewomen. For this purpose screens are to be provided, both of green and of blue gelatine paper, so that the white materials employed in needlework may be changed into a pleasant green by the screen of that colour, the yellow materials to a green by the blue screen, and by one or other of these screens the reds softened down into violets or browns.

4. For either of the last two purposes on a larger scale, the gelatine paper may be attached to the window glass of the apartment, thus colouring, if necessary, all the light admitted during the day-time.

5. Shades for the eyes in certain affections of the sight, to take the place of the green or blue silk and card shades worn by many persons. The gelatine paper, being transparent, will allow the wearer to see his way about, at the same time that the eyes are protected from a glaring light. This may be especially useful in cases where it is desired not only to shade a diseased eye, but also to protect its nerves from strong light admitted by the sound eye. When not only coloured light but a certain degree of darkness is required, this can be readily and delicately graduated by employing shades of different depths of colour.

6. Masks of gelatine paper, for protecting the eyes of travellers against the glare of snow-fields and of sandy deserts.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

Of the Influence of the Strength of the Bath—(*continued*).—We will first occupy ourselves with the cause to which the clearness and vigour are owing. In this case we are assisted by chemical analysis, which gives us the key of the phenomenon. If, in fact, we prepare a sheet of paper in a solution containing 5 per cent. of common salt, and afterwards cut it into three parts, and place one on a bath composed of 8 per cent. of nitrate of silver, another on a bath of 12 per cent., and the third on a bath of 18 per cent., we see at once, when converted into positives, the verification of what we have announced on the subject of clearness and colouring. If we estimate the quantity of silver fixed by papers prepared in the manner we have pointed out, we see that, for a given paper,† each sheet prepared on the bath

At 18 per cent. contains	0·876	of metallic silver
At 12 per cent. contains	0·633	,,
At 8 per cent. contains	0·467	,,

Hence it follows that the proof is clear and vigorous in proportion to the quantity of silver it contains. Now, if we consider that these three pieces of paper were salted in an identical manner, that each of them consequently contained

* Continued from p. 196.

† We consider it necessary to remind our readers, that a bath of a given richness may give different results with papers of different porosity, *the absorption of the salt being in proportion to the porosity.*

a like quantity of chloride of sodium, that this cannot exist in a free state in the presence of an excess of nitrate of silver, and that, consequently, each of them contained a like quantity of chloride of silver, it will be evident that the differences in richness of silver, which are alone pointed out, are due to the differences in the quantity of nitrate in excess, as not only was this the sole point of difference in the conditions under which the operations were conducted, but it also seems more natural to ascribe to the nitrate of silver the differences observed in the result.

It is easy to verify the influence which an excess of nitrate of silver exercises on the value of a proof. Take a sheet of paper, and, after salting and sensitising it in the ordinary manner, divide it into two parts; wash one of the halves in several quantities of distilled water, so as to remove from it all the excess of free nitrate of silver, while the other is left just as it has been prepared; then expose the two halves under the same negative, and great differences will at once be observed. The first half, which contains nothing but chloride of silver, will be acted upon more quickly than the second, it will rapidly attain a violet-gray tint; but this point once attained, it does not go beyond it, and the proof will be finally dull, uniform, and without colour.

The second half will make slower progress at first, but once begun it will proceed rapidly enough; the blacks will mount in tone, while the whites will be well preserved, and, finally, an ordinary proof will be obtained.

The influence exercised, therefore, by the free nitrate of silver is evident; but after demonstrating its existence, and establishing its rôle, an important point remains to be cleared up, viz., the explanation of this rôle. To arrive at this, we ground our observations on two points:—

1. The presence of free nitrate of silver diminishes the sensibility of the chloride. That is a fact which experiment has proved to us, and a fact that every one may easily verify, by precipitating in two glasses a certain quantity of salted solution by an excess of nitrate of silver, washing one of the precipitates by decantation, and exposing both of them to solar light, the one containing chloride in suspension in water, the other containing chloride in suspension in a solution of nitrate. It will be then seen that the first colours more rapidly than the second.

2. When a sheet of paper impregnated with a film of chloride of silver mixed with free nitrate is exposed to the light, the chloride at its surface first blackens by reduction, but this chemical reaction liberates a certain quantity of chlorine in such a way that, by successive planes, a series of films of chloride of silver are formed, and it is to this continued reduction of these successive films that a greater intensity of colouring is, in part at least, due.

Beside this, in albumenised papers especially, a combination intervenes between the nitrate in excess and the organic matter: in albumen it is insoluble, as everybody knows; and if hitherto this fact has not been taken sufficiently into consideration, it exercises a no less important effect on the photographic result, to which we shall refer hereafter.

This theory, which we have reason to believe exact, and which we content ourselves at present by enunciating, we reserve for future consideration and proof, when in the next number we consider the subject of insolation—this theory, we say, joined to the first observation that we have made, assists in explaining the action of nitrate of silver in excess.

In fact, since the chloride of silver is more impressionable when it is insolated, it will be conceived that its reduction is effected more quickly; also that a light, even very feeble, suffices to attack it, and that consequently the whites tint themselves. When the colouring has reached a certain point, the surface is coated with a coloured film that the light has a difficulty in traversing; but for that the proof would increase in tone—equally everywhere, it is true, still it would increase in tone. In the laboratories this fact is verified every day: on abandoning to the light a sufficiently abundant precipitate of chloride of silver, its surface colours by reduction; but however prolonged the action may be, it is only necessary to raise the very thin film to find the subjacent part perfectly white and intact.

(To be continued.)

THE PHOTOGEN.

We confess to having felt a slight degree of prejudice against this invention, arising out of experiments made long since with some of the "Photogenic composition;" but the importance of having a light which should render night photography not only possible, but easy, induced us to visit the Polytechnic Institution with a view to ascertain if the flattering opinions which had been given of the new light in the daily press were well founded.

The claims put forward in favour of "The Photogen" are many. It is the only invention by means of which portraits can be obtained at night equal to those obtained by daylight,—for there appears to be no doubt that the French and American inventions are failures; the compositions hitherto tried in this country, and the electric light, are objectionable for obvious reasons. The apparatus is simple in its construction; it is in shape like a large glass lantern, in the bottom of which holes are contrived for the purpose of admitting air in such a manner as to surround the burning composition in the crucible, and carry off the vapour generated through a pipe at the top of the apparatus, into a chimney or some other convenient outlet. It is inexpensive in its working, the cost of taking the largest sized portraits being about twopence; "while for delicacy of shade, strength, and tone, the pictures are equal to the finest day specimens." Indeed, the inventor states, that on dull days he invites ladies and gentlemen who call upon him to have their portraits taken, to return in the evening, in order that they may be taken by means of his artificial light. It will be seen, therefore, that if all that is stated with respect to this light be true, there is hardly anything wanting to render it perfect; and we are bound to say that, having seen portraits produced by this light under circumstances more favourable than exist at the Polytechnic Institution, this perfection is very nearly attained. We have before us portraits taken by the Photogenic Light, which, as regards delicacy of finish and graduations of tone, are nearly equal to the very best pictures taken by daylight, under the most favourable circumstances, that we have ever seen; and superior to portraits taken by daylight under circumstances less auspicious.

The manipulations in no respect differ from those employed in taking portraits by daylight; and the process has the additional advantage of being certain in its operation; in fact, in no instance did we observe a failure in the experiments made in our presence. The time of exposure in the camera is regulated by the time occupied in the combustion of the composition—thus the risk of over or under exposure is avoided, and the sitter is not annoyed by having to sit a second time—a matter of some importance, as many people are somewhat nervous on undergoing the operations of "having their likeness taken," and, in such a case, the second attempt is not likely to be more successful in producing a good portrait than the first. The rapidity of the action of this light is surprising when it is remembered that it is artificial, fifteen seconds, and even less, being all that is required for the purpose.

In conclusion, we may remark that, however agreeable it may be to visit the Polytechnic Institution—and its attractions are great, if we may judge from the thousands who were present on the night when we visited it—it is not the best place for photographers to examine *minutely* the merits of "The Photogen;" its capabilities as an illuminating agent may, however, be seen to better advantage there than elsewhere.

We had almost forgotten to mention that the eyes of the

sitter are in no way dazzled by the brilliancy of the light; this being obviated by the intervention of a blue glass and fan, which intercept a great part of the light, while they allow the greater portion of the actinic rays to pass through.

THE MOLECULAR ACTION OF CRYSTALLINE PARTICLES.*

BY DR. A. WELLER.

THE immersion of a piece of bread in champagne, to renew the effervescence, is merely an example of the contact of a fresh surface with the gas: in a short time it ceases to have this effect; but if a fresh piece of bread is used, the effervescence is renewed as before. The difference of effect between this and a piece of metal arises from the superior extent of surfaces presented by the cavities of the bread. The disengagement of steam from boiling water by platinum foil or any other solid substance, is likewise of the same nature. After a very short time this effect ceases, unless renewed by a fresh surface. The most natural explanation of these phenomena is to refer them to some molecular action of the solid upon gas, probably of a mechanical nature, which lasts a very short time, when the solid acquires a *droit de domicile* in the liquid, and becomes perfectly inert. M. Legrand, who has made some correct experiments on the point of ebullition of saline solutions, remarks, that platinum possesses no power in equalizing ebullition after a few moments, when, according to him, all the air has been expelled from its surface; but, on the contrary, zinc and iron will act as long as they are present in the liquid, which he attributes to their power of decomposing water.

Previously to showing the existence of the same action in bodies in a state of vapour, I will make a short digression with respect to the constitution of vapours in general. The term vapour is commonly applied to bodies in three different conditions. 1st. That of temporary gas diffused in the atmosphere. 2nd. That of liquid particles mechanically suspended there. 3rd. That of solid particles suspended in like manner. To the two latter, to speak more correctly, may be applied the term of *fumes;* the first corresponds to the solution in a liquid, and the others to that of suspension in the same. As examples of the first we have the vapours of water while in an invisible state, and those of bromine, &c.; of the second, water as in mists, fogs, &c.; and of the third, the vapours of arsenic and of corrosive sublimate. Bodies in either of these conditions possess the faculty of assuming a definite crystalline form on becoming solid. The properties of the gaseous vapours are so well known, that it is unnecessary to dwell upon them here. The second class of liquid globular vapours or fumes, which, as we have said, cause those accumulations known under the name of fogs, clouds, or mists, are those which I intend at present to examine, as they comprehend the theory of fixation of the mercurial vapours in the daguerreotype. It was formerly believed that vapour or mist was composed of minute spherules or globules of liquid water, and in Newton's works we find evidence that such was his opinion. According to another view, first advanced, I believe, by De Saussure, these vapours were composed of vesicles or very minute bubbles, exactly resembling, on a small scale, the common soap bubble: this opinion has received the assent of Fresnel and Berzelius, and at present obtains general credence. The proofs on which it is considered to be founded are principally the observations of De Saussure, who asserts that on high mountains, or in the clouds, he has been able to detect these air vesicles with the naked eye, and has seen them burst as they came in contact with each other. Berzelius recommends the examination of the vapour of water over a dark surface, such as that of ink, with a lens of a short focus. He says that vesicles may be detected in this manner, varying in size from $\frac{1}{2500}$th to $\frac{1}{1750}$th of an inch, which occasionally burst as they touch each other. The suspension of clouds is also used as an argument in favour of the vesicular theory, as it is contended that liquid spherules would descend to the ground by their specific gravity in such situations: Fresnel, indeed, compares the globules to small balloons, which dilate or contract, according to the temperature of the air they contain.

(To be continued.)

* Continued from page 196.

Critical Notices.

EXHIBITION OF THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.*

THE inspection of the views by Cade has given us much pleasure. These views are small compared with those we have already noticed, but they are exquisitely fine in tone and detail. "The Fitzwilliam Museum, Cambridge" (157) is very clear in tone, and the perspective is very effective; even the ornamentation at the side of the picture is clear and distinct. "Corpus Christi College, Cambridge" (158), is not as equal in tone as the former. The body of the picture is too dark, while the turrets at the top of the building are too white. "Sir Isaac Newton's Tower, Trinity College" (159), has many of the characteristics of a good photograph; in it we see great equality of tone, and the tint, which is of a grayish colour, adds much to the effect. In the photograph of "St. John's College, New Buildings, Cambridge" (161), there is a particular softness, combined with minute microscopic detail. In this picture there is greater perfection than in any one of the series, and it is particularly free from spots and defects. "Interior—Trinity Library" (178), is a good photograph of a difficult subject. It will be seen that a very strong light was shining through the windows when the photograph was being taken. This does much to spoil the effect of a picture, as intense light always destroys effect. The ceiling is very finely given. "Walberswich Church, Suffolk" (179), is a well executed photograph, and has much more foreground detail than many of Mr. Cade's pictures. Altogether these views by Mr. Cade do him great credit, and we hope to see some more by the same artist in future exhibitions. The brilliant and beautiful photographs by Frith of Egyptian scenery are already so well known to the majority of our readers, that it would be superfluous on our part to criticise them at any great length. They possessed such merit, and received such well deserved encomiums, that it is almost matter of surprise that any one should have attempted to photograph Cairo so soon after Frith had done it. However, we have here a series of views of Cairo by Robertson and Beato, not so large, nor yet so beautiful, as those of Frith. We do not intend going into detail; suffice it to say, that they have all the characteristics and peculiarities of oriental photographs. Many of the views are extremely interesting, among which we may mention the "Tomb of the Mamelukes" (198), and the "Tombs of the Mamelukes and Caliphs" (203). In many of the photographs there is great nicety of detail, and generally the sites are well selected.

The next series are the old Spanish views by Lousada. We are astonished to see these photographs here, since, apart from the interest attaching to those views themselves, there is nothing to recommend them as photographs, and they are very bad as architectural studies; for instance, in some of the architectural views illustrated there is really a great deal of fine detail, but in the photographs by Lousada there is nothing but masses of black and white, with no half-tone. A few Oxford views by Cocke are very mediocre indeed. They will not bear the slightest comparison with Cade's Cambridge views; or even with any of the Oxford views we have seen. They have some few good points, but are generally too dark. We cannot say much of the selection of the site for the "Bird's-eye view of Westminster Abbey" (258); if we are to judge of the artist's ideas by the results, we can only say that he has attempted to take, in addition to the bird's-eye view of the Abbey, as many of the intervening chimneys as could be got into the picture. Baldus's Paris views are certainly the worst we have ever seen executed by this artist. They are not clear in tone, nor interesting in

* Concluded from page 199.

subject. He has introduced into one an artificial sky, which we do not like. Indeed, we are surprised to find that a photographer, who has earned such well-deserved laurels as M Baldus, has allowed such very bad pictures to leave his studio.

Taking the photographs as they are catalogued, we next come to the Egyptian views by Frith; of these there can not be two opinions—they have deservedly established the reputation of Mr. Frith as a first-class photographer. Of the English views by the same artist, we cannot speak so highly. There is, if we may use the term, a decided mannerism in them. They are treated exactly in the same way as the Egyptian views: each photograph having a great intensity of black and white, and looking as though they had been taken under a scorching Eastern sun. This is a fault which is rendered more strikingly apparent by the contrast it offers to the Egyptian views. In the Eastern views there is much detail, while, in the English views, foliage is rendered in black masses. The view of "Inverness" (308*) is a most faulty picture; it is full of spots, and is altogether a very bad photograph. The water in the foreground is especially bad, while the stones in the bed of the river appear much as though spots of soot had accidentally fallen on the negative. There is an exquisite little view here by Cade, of the "Terrace at Sir William Middleton's," which we are inclined to think far surpasses any of those pictures already noticed. The views by Gutch, the "Exterior and Interior of Holyrood Chapel" (311F, 311G), are not equal to some we have seen by this artist.

Since the exhibition of the photographs of the Royal Engineers at South Kensington, we are not enabled to perceive any advance in the manipulation of these military photographers, if the "Rochester New Bridge," and the "Rochester Cathedral" (311H, 311K), are to be taken as specimens of progress.

And now we come to the most charming series of pictures in the collection. When we say they are executed by Bedford, need we say more? There are twelve views which have been "taken expressly for the association." We cannot help thinking that, when the association obtained Mr. Bedford's services, they ought at least to have asked him to have chosen some other subject than "Tintern Abbey." We have had this splendid ruin *ad nauseam*. The only thing that makes the present views at all bearable, is the astonishing perfection in which they are rendered. When we compare the views by Cocke with those by Mr. Bedford, we are then enabled to judge how far Mr. Bedford can surpass all other photographers in his execution. In no piece is this so perceptible as in the "View of the Choir looking East" (312), and in the same view by Cocke. In the one there is clearness of tone, detail in the foliage, and a beautiful perspective half tint as seen through the window of the Abbey; the foliage in the background is given with the greatest nicety: while in the other we have few or none of the characteristics of Bedford's photographs, and the foliage as seen through the window is only discernible in small patches. "The West Door, Tintern Abbey" (321), is a marvellously clear photograph; even the large nails in the door are easily discernible. But decidedly the best views are "The Donjon, Raglan Castle" (315); "The Entrance Gate, Raglan Castle" (317). In these we can see almost the form of every leaf, clear without even the aid of a glass; all the foliage is crisp, and every sprig of the delicate tendrils of the creeper as it reaches upward, looks as though it were a copy of some finely pencilled picture; indeed, the mass of foliage seems almost to invite one to put one's hand among the leaves. We confess we are at a loss to do full justice to these inimitable photographs. By the aid of a magnifying glass the detail of the grass could be almost seen. No photographer who exhibits in the present collection can compare with Bedford for the clearness of his foregrounds; whilst the lens with which these views were taken must be as near perfection as human skill could make it. There is a number of photographs here by Mr. Bedford which were exhibited in 1857. They are beautiful, but when we compare them with the new pictures, they show how decided are the marks of progress in Mr. Bedford's manipulative skill. The most beautiful of the old series is the celebrated "Baptistry of Canterbury Cathedral" (340), which attracted so much attention when first exhibited.

Of the Italian views by Ponti we are not able to say much They lack what is needful to make them good photographs. There is a fault in them which seems to be prevalent in the pictures exhibited in this collection—too much black and white, and a want of half-tone. Some have many good points, but generally speaking, they are not such as to merit a long notice.

In conclusion we can only remark, that we think it would be almost desirable to introduce stereoscopic views as a part of the exhibition. One of the leading objects of the association is "to form a collection of photographs for the association; and, if thought desirable, to exhibit them;" and, of course, to distribute them to subscribers. There are many persons who would gladly subscribe, if among the photographs there were some good stereoscopic slides—such, for instance, as those by Sedgefield, which we recently had occasion to notice.

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

Backgrounds.—The importance of a judiciously-managed background cannot be too highly estimated, and for want of care and judgment in this matter, many otherwise fine pictures are spoiled. It is stated that Sir Joshua Reynolds so highly appreciated the importance of the subject, that, although he frequently entrusted the filling-in of portions of his pictures to pupils, he never trusted a background to any pencil but his own. The primary object should be to give relief and prominence to the figure; but, in addition to this, a background frequently serves to connect and harmonise the whole colouring of the picture. A glass positive, with a clean untouched background, may sometimes be left uncoloured, and present a simple, unpretending effect; but it will have the disadvantage arising out of the tendency, well known to painters, which a flat plane of any uniform colour, especially if light and warm in tone, has to advance and obtrude itself upon the eye, and cause a want of atmosphere in the picture.

The natural tint of the background in the photograph is of some importance to the colorist, as, without a suitable ground to work upon, it is difficult to produce a satisfactory effect in colouring. By all means avoid white, especially the dull tawny white so often seen in common glass pictures. The best relief is given to the figure when the background is darker than the lights, but not so dark as the deepest shadows of the picture. A white background affords no relief or contrast to the face, and is, moreover, unsuitable for good effects in colouring. A very dark background is also difficult to colour, and by its depth impoverishes the shadows of the face. The best background for all effects in colouring is a gray, moderately dark. This is most easily produced by placing behind the sitter a screen covered with common sheeting calico, coloured in distemper with a mixture of black and white, forming a gray of about the tint desired in the photograph. To obtain the light behind the head, so much desiderated by some photographers, the screen should be painted and "flatted," using a similar gray, which on the required part of the background should gradually merge into white. To produce good results, this should be done by a painter.

In colouring the background, the colorist must be guided, primarily, in the selection of tints, by the complexion of the sitter, and then by the colour of the draperies. Of the general principles which regulate harmonious colouring, we shall, as we have said, speak hereafter. We may here briefly indicate that the effect of greens is to increase the rosy hue of the complexion; of violets and blues, to give it a somewhat yellow tinge; grays suit almost every complexion. Positive colours should be avoided in a background; the more neutral the tints, the more they will add to the quietness and repose which is desirable. A uniform tint of any colour should be avoided, as that gives to the figure an inlaid effect. Atmosphere is best obtained by the use of broken tints, and the judicious management of light and shadow on the background, arranging it so that the light

falls on the background from the same direction as on the sitter.

We have made no reference to any first colouring of the background, for this reason—in it is not required either the brilliancy of colour, or the solid effect, desirable in the more prominent parts of the picture; we think, therefore, one colouring, and that after varnishing, produces generally the best results. Under some circumstances this method may with advantage be modified, and in this respect experience must guide.

The colorist may use either background colours already mixed to the required tints by the manufacturer, or he may mix the different tints as occasion may require. As to the method of proceeding, one illustration will suffice: Suppose the background to be coloured is desired of a greenish gray. The figure is quartered a little from the light, so that the retiring portion is in shadow; the strongest light in the picture is on the head and face, and the chief light in the background is behind the head. Commence here with a mixture of silver gray and green, working round the head, carefully avoiding the hair, especially where it joins the background in light feathery locks. This light tint must gradually merge into a mixture of deeper gray and green as it approaches the shadowed part of the background; in the deepest shadow, towards the lower part of the picture, a little purple may be added to the mixture of dark gray and green. Around the outlines of the figure a pencil moderately small must be used, to enable the colorist to cover the background clean up to figure without impinging upon it; for the large plain surface a large soft pencil must be used, blending the whole as smoothly as possible.

Such a background as we have described has an exceedingly good effect, and to our taste is much superior to those in which a number of unmeaning objects, as columns, curtains, vases, &c. are suffered to obtrude. By some photographers, and many of the public, landscape backgrounds are much admired. If well managed, they have often a good effect. We shall treat of them next week.

(To be continued.)

Photographic Chemistry.

ORGANIC CHEMISTRY—*(continued)*.

AMONG other substances which we obtain from vegetables are *gums*, most of which bear a striking resemblance in their composition to starch. They are generally soluble in water, though not capable of crystallising. Gums are of different kinds, and very numerous, but it is not necessary that we should enumerate them. As we have already stated, alcohol $C_4 H_6 O_2$, is formed from sizings by fermentation. It is a neutral substance, liquid, inflammable, and volatile, and is a *solvent* of many oily or resinous bodies—dissolving or assisting in the solution of various re-agents which are insoluble in water; such as gun-cotton, for example, which is used in the preparation of collodion. It coagulates albumen, and is employed in throwing down certain salts from their aqueous solutions, which, as we stated in a previous part of these papers, can thus be obtained in a state of great purity. This method of obtaining salts is usually adopted in the case of the double hyposulphite of soda and gold. There are bodies analogous to these in chemistry, but they are rarely employed by photographers. Alcohol may be said to form the starting point of a rather numerous series of chemical products, some of which are extensively used as solvents; as, for instance, sulphuric ether and acetic ether. There is also another body analogous to these—aldehyde—which is a powerful agent for the reduction of salts of silver, although it is not used much at present. The greater number of these compounds resemble each other in being liquid, volatile, and inflammable; and we need scarcely remark, that very great precaution is necessary in using these substances in a room where a light is burning.

Certain vegetable productions, when submitted to distillation in the presence of water, yield a more or less odorous and volatile oil, which is termed an *essence* or *essential oil.* These essences are of different kinds, according to the vegetable from which they are distilled, but all differ from the fatty or common oils. Suppose we let a single drop of one of these freshly-prepared essences fall on a sheet of paper, a spot will result resembling in appearance one caused by a fatty oil; but after a few seconds this will gradually disappear—in this respect differing from a fixed oil, which would have remained until removed by artificial means. Essential oils gradually absorb oxygen from the atmosphere, and after some time change from being fluid, at ordinary temperatures, to solid, and are, in fact, converted into a resin. In general, essences have the property of dissolving fatty bodies, and they have been, therefore, sometimes employed in heliographic processes.

The various products that are termed *resins* are, for the most part, soluble in ether, alcohol, and essential oils, and insoluble in water, and their principal use is in the composition of varnishes. The experiments of M. Nicephore Niepce, as well as those of his nephew and others, show that certain of these resins possess the singular property of being acted upon by the light in such a manner as to render them insoluble in essential oils or ethers, which were previously capable of dissolving them. The discovery of this property in the case of the bitumen of Judea, by the elder Niepce, led to the employment of other resins in the various processes of chemical engraving and photo-lithography.

We include, under the name of *fatty substances*, the fixed oils, butter, the different greases, and the fatty acids which are derived from them, such as margaric and stearic acids, which are employed in the manufacture of candles, &c. Fatty oils are of two natures; some of them thicken and harden on contact with the oxygen of the atmosphere, and these are termed *drying oils;* others do not thicken and dry, and among them may be included the oil of olives and sweet almonds. There are a large number of these fatty bodies, but it is not necessary that we should enter into a description of them here; suffice it to say, that they are employed extensively in the manufacture of the various kinds of soap.

(To be continued.)

Dictionary of Photography.

ALBUMEN *(continued)*.—Pure albumen is said to have a faint acid reaction. As stated above, the coagulation of albumen commences at 140°. If the albumen be undiluted, as in the white of an egg, it solidifies into a white gelatinous mass, and it appears to coagulate with the more difficulty in proportion to the quantity of water with which it is mixed. When very dilute the solution merely becomes thick and turbid, but on ebullition it collects together in flakes, which then may be easily separated from the liquid by filtering. Coagulated albumen does not dissolve in water, but merely swells up in it; when perfectly dry, it absorbs in this manner four or five times its bulk of water. Many chemical reagents cause the coagulation of albumen in the cold. Alcohol immediately precipitates it in the insoluble form; ether does not produce this effect in so great a degree. Creosote and strong mineral acids immediately cause the coagulation of albumen. Albumen also is precipitated by alum and many metallic salts, such as silver, copper, mercury, or lead salts. On this account, the administration of raw white of egg is recommended in cases of suspected poisoning by any of the above salts: if the suspicion be unfounded, the dose does no harm; whilst if the metallic salt really has been taken, the albumen enters into immediate combination with it, and protects the body from the action of the poison, whilst other remedial measures are being taken. On the other hand, this coagulability of albumen by

metallic salts is the reason of the value of corrosive sublimate for the preservation of anatomical specimens. The mercurial salt enters into combination with the albumen and arrests putrefaction. If alkalies be present in tolerable quantity with solutions containing albumen, the solution does not coagulate when heated, but merely forms a skin over the surface, similar to that which forms on milk when heated.

Alcohol is a colourless and very thin liquid lighter than water; its burning astringent taste, agreeable odour, and intoxicating action, are well known. In its most absolute form, when exposed to a very great degree of cold, it becomes viscid, but does not solidify, and for this reason it is employed instead of mercury for thermometers which are to be exposed to very low temperatures. Its specific gravity when pure is 0·792, and its boiling point 172°. Its chemical composition is expressed by the formula $C_4\ H_6\ O_2$, or $C_4\ H_5\ O,\ HO$. It is prepared by distilling liquids which have undergone vinous fermentation, such as wine, beer, or brandy. The distillation is repeated once or twice, rejecting the parts which last came over; the alcohol, being more volatile than the water, passes over first. Alcohol is frequently contaminated with *fusel-oil*, which imparts to it a peculiar, disagreeable odour. It is difficult to separate this substance from it on the small scale, and therefore care should be taken in purchasing a quantity of alcohol that no impurity of this kind exists in it. The presence of fusel-oil in alcohol may be recognised by the taste, especially after dilution with a large quantity of water, and by the odour, especially after rubbing it between the hands, or letting it partially burn away. Alcohol, free from fusel-oil, should remain clear when mixed with nitrate of silver, and exposed to sunshine; but spirits of wine, containing fusel-oil, assume a faint red tint. Alcohol, in its strongest form, or *absolute alcohol*, cannot, however, be obtained by mere fractional distillation; for, although alcohol boils at 172°, its vapour nevertheless takes up by adhesion a quantity of aqueous vapour, hence the most highly rectified spirit obtained by repeated distillation still exhibits a density of 0·820 to 0·830. The complete dehydration of alcohol is usually effected by distilling the most highly rectified spirit over fixed substances, which have a strong tendency to retain the water: *quick-lime* is most usually employed. About equal weights of good quick-lime and strong spirit are left in contact with each other in a closed vessel for a few days; on being distilled in a water bath until about half the alcohol has come over, and this distillate being again treated with lime, and distilled as before, absolute alcohol is produced. In very careful experiments, however, it will be advisable to rectify the alcohol so obtained over dry charcoal powder and a little crystallised tartaric acid, in order to remove a slight smell which it has acquired, and also a little lime which has been carried over. Alcohol may be regarded as perfectly anhydrous if sulphate of copper previously burnt white and immersed in the alcohol does not recover its blue colour after remaining in contact with it in a closed vessel for a few hours.

Of elementary substances alcohol dissolves only a few, such as sulphur, phosphorus, iodine, &c., all of the non-metallic class. Of *inorganic* substances it may be stated as the law that all compounds soluble in alcohol are also soluble in water; but some compounds are soluble in water which are not soluble in alcohol; and substances which are soluble in both liquids dissolve more abundantly in water than in alcohol. There are, however, certain exceptions; thus, corrosive sublimate dissolves more abundantly in alcohol, especially in absolute alcohol, than in water. It may also be laid down as a general rule, that *efflorescent* compounds are insoluble in alcohol; and deliquescent substances, excepting carbonate of potassa and a few others, are soluble in alcohol. Many substances, when dissolved in alcohol, impart to it the property of burning with a peculiar coloured flame,—*e.g.* boracic acid, and the salts of lithia, baryta, strontia, lime, copper, &c.

Alcohol mixes in all proportions with ether. If the latter be in excess, a portion is separated on adding water; but if the alcohol is in excess, a homogeneous mixture is formed.

Of organic bodies alcohol dissolves all compounds consisting of carbon and hydrogen, or carbon, hydrogen, and nitrogen. In compounds containing oxygen, the solubility, as a rule, diminishes as the proportion of oxygen increases. Organic acids which are but slightly soluble, are quite soluble in alcohol; they likewise yield salts of a similar character.

(*To be continued.*)

A Catechism of Photography.

PREPARATION OF THE COLLODION—(*continued.*)

Q. Is bromized collodion regarded as of any great value?

A. It is; and the better it is known, and the more extensively it is employed, the more its good qualities will be admitted. The following is an excellent method of preparing it:—

Pure ether	8 drachms.
Spirits of wine, 60° above proof ...	½ drachm.
Gun-cotton	6 grains.

And

Crystallised nitrate of silver ...	2 grains.
Bromide of ammonium	10 grains.
Spirits of wine	2 drachms.

Shake well together; add one drachm and a half to every ounce of the collodion.

Q. How is the gun-cotton prepared?

A. By immersing a portion of cotton in a mixture of the strongest nitric and sulphuric acids.

Q. Are all cottons so prepared equally good?

A. It has been noticed by most photographers that the cotton exhibits great variations in solubility, and, when dissolved, in the tenacity and transparency of the fibres. Mr. Hadow, who has devoted considerable attention to this subject, says:—"The difference in properties is owing to the gradual weakening of the acid mixture in consequence of the nitric acid being removed by the cotton, with which it becomes intimately combined, at the same time that the latter gives out a proportionate quantity of water."

Q. What remedies have been suggested?

A. The authority already quoted made several interesting experiments in the preparation of gun-cotton, and five varieties were obtained. First—gun-cotton, properly so called, as before stated, quite insoluble in any mixture of alcohol and sulphuric ether. Secondly—an explosive cotton, likewise insoluble, but differing chemically from the first, obtained by a mixture of certain strength when used cold. If warm, however, either from the heat produced spontaneously on mixing the two acids, or by an artificial increase of the temperature to about 130°, the cotton then immersed becomes perfectly soluble, producing a third variety; if, however, it be thoroughly dried, it becomes in a great measure insoluble. The fourth is obtained by the use of weaker acids used cold; and the fifth, when the mixture has been warmed to 130° previous to the immersion of the cotton. In either of the last two cases the product is perfectly soluble, but there is a remarkable difference between their properties; for, on dissolving six grains of each in one ounce of ether, the cotton, treated with warm acids, gives a perfectly fluid solution (which is likewise the case with the third variety, produced by acids somewhat stronger), while that obtained by the use of cold acids makes a mixture as thick as castor-oil.

Q. What was the practical result of these experiments?

A. Further experiments were made in order to test their adaptability for photographic purposes; and it may be safely affirmed, that in this important particular there is no very striking difference.

HOW TO CHOOSE GLASS.

Q. What sort of glass should be selected for the collodion process?

A. The selection of glass for photographic purposes requires great care and judgment. The patent plate glass answers, perhaps, better than any other kind. Flatted crown glass is also very good. Common window glass is often inferior, having scratches upon the surface, each of which necessarily occasions an unevenness of coating, and an irregular action in development.

Q. Is it necessary for the glass plate to be perfectly flat?

A. Yes, this is essential. 1. Because if the glass is not flat, some parts of the image must be out of focus; and 2, the plates are apt to be broken in compressing during the positive process.

Q. How do you clean a glass plate?

A. First, the glass must be fixed in a frame by means of a wooden screw; then the surface should be washed with a mixture made with clean water and tripoli, strongly impregnated with nitric acid. The rubbing should be conducted in a circular direction with a piece of flannel rolled up in a lump; and before letting the mixture dry, the tripoli must be got off by rubbing the glass longitudinally with a second piece of flannel; subsequently it should be rubbed circularly with another piece, and then brushed with a brush of badger hair, which will render it perfectly clean.

Q. Can you suggest any other methods?

A. A mixture of water, ammonia, and emery, is found very efficacious in cleaning glass plates; they should afterwards be washed with alcohol and water. Another plan is, to put all the glass plates in the sink, where the washing water (containing cyanide of potassium) is poured. If the plate has been varnished, it should remain there for seven or eight hours; but if not, a very short time will suffice. When removed from this liquid rub the glass with the hand, wash in a large quantity of water, and then wipe dry; when required to be used, pour on it a drop of very pure alcohol, and then clean it off with two successive pieces of fine filtering paper; but perhaps the best plate-cleaning solution that can be used is that given in the PHOTOGRAPHIC NEWS, vol. i. p. 156.

Q. Is not old collodion used for cleaning plates?

A. Old collodion, which is unfit for photographic work, is a first-rate material for cleaning glass plates. Take a small tuft of cotton wool; pour a few drops on the glass plate, and rub in a circular direction till nearly dry; then finish with a wash-leather.

Q. What other suggestions can you offer on this subject?

A. First. That before proceeding to wash the glasses, each square should be roughed on the edges by means of a file or a sheet of emery paper. This precaution is necessary, as otherwise the fingers are liable to injury, and the collodion film is apt to contract from the sides, the result of which is an imperfect picture. *Second.* That cloths used in cleaning plates, which should be of fine diaper, must be used for no other purpose, and must be washed, not in soap and water, but in pure water only. *Third.* That it is advisable to use additional care in preparing the glass for positives.

(To be continued.)

Correspondence.

PRINTING IN CARBON.

SIR,—I presume that the carbon prints laid before the Society by Mr. Pouncey at their last meeting may be considered the best he can produce, and that when they are criticised he will not turn round and say—"Oh! the thing is in its infancy yet. It is not fair to judge of my process by what I have been able to accomplish hitherto." This argument was made the most of on Tuesday night: we were exhorted to assist Mr. Pouncey in improving his process, and so forth. Now I have no hesitation in saying that his process is incapable of improvement. I do not see the slightest reason for believing that, if he were to work at it for the next twenty years, he could produce anything better than one or two of the prints he exhibited last night, and for this reason:—The carbon has to be ground as painters grind their colours, and everybody is aware that there is a limit to the mechanical division of substances which cannot be passed, consequently, these particles of carbon remaining unaltered (chemically) on the surface of the paper, give a sort of grain to the picture, which enables anybody to detect, with the greatest certainty, a carbon print from a silver print from the same negative when the two are placed side by side, as was the case on Tuesday night. This same opacity of the carbon renders the prints taken by the process far inferior to the silver prints in the matter of aërial perspective, as they do not possess the delicate tones of a silver print. In the latter there is a gradual and beautiful shading of the light into darkness, which is not to be found in the former. In the pictures exhibited last night, for instance, by Mr. Pouncey, and which had been most certainly prepared with the greatest care, these drawbacks were distinctly visible to everybody capable of distinguishing a good photograph from a bad one. I wish it to be clearly understood that I say this of the *best* pictures exhibited by Mr. Pouncey.

Perhaps I can best explain my meaning to those who have not seen these pictures by saying, that whereas, in the silver print, the stone columns appeared perfectly smooth and unworn, in the carbon print they had a weather-beaten appearance—due, undoubtedly, to the particles of carbon remaining on the surface of the paper; and this, I repeat, will always be the case with carbon prints, inasmuch as mechanical subdivision cannot be extended beyond a certain point, which is far surpassed by the action of chemical re-agents.

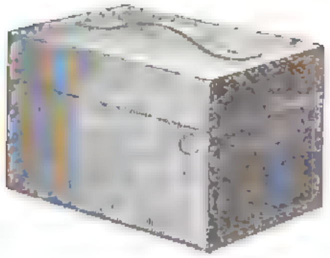
I freely admit that the carbon process may be made useful, but I do not admit that it can ever equal the process of silver printing. It has been urged by some, that, even if the carbon process be in some respects inferior to the silver process, yet its undoubted permanence renders its employment advantageous, seeing that nearly all silver prints fade away. In the first place, a carbon print is *not* indestructible, as our respected vice-president, Mr. R. Fenton, very judiciously remarked. Neither is it fair to assume that, because carbon is unassailable by many chemical agents which attack chloride of silver, it is as insensible, when in combination with bichromate of potass, as in its pure state, to the effect of light and gases, which have a deteriorating effect on silver prints. In the next place, I entirely agree with Mr. Malone that there is not an absolute necessity that silver prints should fade. I could offer the contents of my own portfolio for examination; but I can refer to the statement of Mr. Malone for a more striking confirmation of this, viz., that a photographic print taken in 1844, upon which no particular care has been bestowed, remains at the present moment in precisely the same state as when printed, having lost no portion whatever of its original brightness and freshness during all the years which have since elapsed. There is no doubt, either, that numbers of photographs of "many years' standing" exist in gentlemen's libraries of which we know nothing.

Under these circumstances I would not advise any photographer to abandon the process to which he has been accustomed, but rather to turn his attention to discovering a method of rendering them *undoubtedly* permanent; and I take this opportunity of protesting against any expenditure of the Society's money on Mr. Pouncey's process. He must be driving a very fair trade in carbon and other *matériel* connected with his process which, together with the sum collected for him by his Jersey Mecænas, must be paying him very well indeed for what he has done.—I am, sir, your obedient servant,

AN *ex*-MEMBER OF THE COUNCIL.

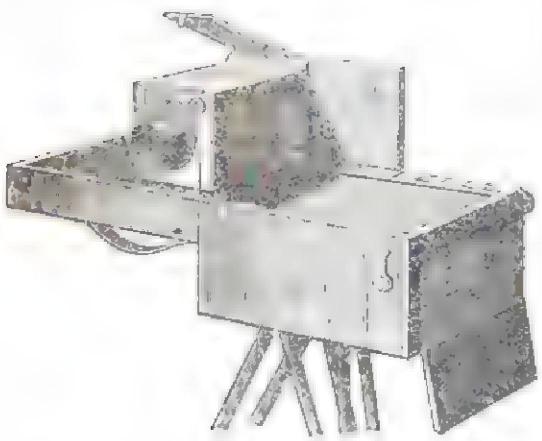
PORTABLE STEREOSCOPIC CAMERA.

(*Registered December 27th*, 1858, *by* T. H. Powell.)



The drawing above exhibits the apparatus when closed, in which condition it is carried by the leather handle on the top. It contains all that is necessary for taking eight stereoscopic pictures by any of the dry processes. The outside measurement is $9 \times 5\frac{1}{2} \times 6$ inches, and the weight is 5 pounds.

To set up the apparatus for use:—Screw it on the stand with the lock towards the left hand, for which purpose a plate is let into the bottom of the box; unlock, and turn back the lid; raise the camera, which is a folding one; press the front into its position (the lens being already on it); turn the camera at right angles, with the lens pointing towards the object to be taken; open the door at the end of the box; take out the back holder and gray glass, and place them in the groove at the back of the camera made to receive them. The apparatus will then be as represented in the drawing below.



The camera slides on a groove, which is continued along the top of the box and the inside of the lid; by this means a movement of any length up to 13 inches can be obtained, and can be varied according to the distance of the object from the lens. A scale of inches is engraved on the edge of the groove, to determine the length of movement; a portion of the groove is also made moveable at the left-hand side by a screw, in order to adjust the angle. The brass mounting is constructed to take two lenses of different foci, the one not in use fitting on to the door of the box.

To arrange the apparatus for taking a picture:—Slide the camera to the right until its right-hand edge rests on the line registering the number of inches of movement required to be used; notice the portion of the object cut by the pencil line in the centre of the gray glass; move the camera to the left as far as the groove will allow it to go, and if, on again looking at the gray glass, the same part of the object touches the line, the angle is correct; but if a movement has taken place, the screw which adjusts the moveable part of the groove must be turned until the object is the same as when the camera was in its first position. Having properly adjusted the angle and focussed the picture, remove the gray glass and substitute one of the double backs (four of which are contained in the box, each holding two prepared plates). To expose the picture, proceed in the same manner as with an ordinary stereoscopic camera, taking the first picture on the right-hand side, and the second on the left.

The object in the construction of this apparatus has been to make it as portable, and at the same time as simple, as possible, so that it may be easily put together; also, to avoid the use of loose pieces, which are objectionable from their liability of being left behind when packing up. A specimen can be seen at Messrs. Horne and Thornthwaite's, of Newgate-street, by any one wishing to judge of its capabilities.

A NEW METHOD OF PROTECTING VALUABLE NEGATIVES.

Dear Sir,—Like many other persons, I have often had the misfortune to injure collodion negatives on glass that were valuable, or, from various circumstances, could not be replaced. This has occurred to me most frequently while printing from them; but sometimes it has happened in carrying them about, or, from not putting them by with sufficient care.

To guard against such accidents as this, I have been led to contrive the following simple plan for their effectual protection; and thinking that it may prove useful to many amongst the numerous readers of your widely circulated journal, I beg to place it at your disposal:—

I first varnish the negative with a hard varnish, in the usual manner. Then I take either a sheet of very thin talc, or of the fine glass made expressly for covering microscopic objects, of the same size as the plate to be protected. This I lay upon the varnished surface, and secure it in the correct position by binding the edges of both together with narrow slips of gummed paper. Both the talc and the microscopic glass may be readily procured less than the $\frac{1}{100}$ of an inch in thickness. Owing to the extreme tenuity of either of these materials when thus employed, not the slightest indistinctness will be produced in the positive taken from a negative after being thus prepared. Herewith I enclose a print for your inspection, which was taken from a negative protected in the manner just described, and I think you will agree that there is no loss whatever of sharpness or definition by the process employed.

It will be seen that, by this simple arrangement, the great advantage will be secured that, *any number of impressions may be printed from a negative when thus treated, without in any way injuring its surface*, and it follows that the last impression will be in every respect equal to the first.

To those who print from stereoscopic and other negatives for sale, the plan will, I think, prove very valuable. When an inquiry has been made of such persons for a particular picture, I have frequently heard them reply, "Oh! we cannot print any more of that subject, the negative is quite worn out." Now such a result could not occur were my method adopted; and as very high prices are frequently given for first-class negatives, it must be a matter of importance to obtain as great a number of copies from them as possible. The public would also be benefited by the reduction in price of each copy, if the number of impressions which could be taken from a single negative were almost unlimited.

If at any time the talc or glass, as the case may be, should be scratched or otherwise injured, by passing the point of a penknife round between the edges of the plates it can be readily removed, and replaced by another piece in the same manner as before. Not the least recommendations in its favour are, its simplicity, and the fact that—as there is not the slightest risk of injuring the picture in its application, no person need fear to make a trial of the plan, even upon the most valuable negative in his possession.—Believe me, dear sir, yours very truly, John Browning.

111, *Minories*.

[It might be imagined that the plan recommended by our correspondent would have the effect of injuring the sharpness of the resulting positive; from experiments which we have witnessed, however, we can assure our readers that the slight diffusion which the light would necessarily experience in its passage through the protecting film, is so small as to be quite inappreciable, except perhaps when the printing has to be effected by means of a prolonged exposure to faint diffused light: and, even in this case, we hardly think that it would be attended with any more serious effect than a slight increase of softness and artistic effect.—ED.]

Photographic Societies.

LONDON PHOTOGRAPHIC SOCIETY.

THE usual meeting of the London Photographic Society was held on Tuesday evening, which was presided over by Mr. R. Fenton.

After the usual routine business had been disposed of, the President called the attention of the meeting to the subject under discussion, viz.—the adjourned debate on carbon printing.

The first who rose was Mr. Pouncey, who read—as well as he was able—a round-text composition, which contained nothing whatever of importance, but consisted mainly of a series of inuendos against sundry persons and periodicals. His mode of printing was elicited in the course of the subsequent discussion, and consists in taking a saturated solution of bichromate of potass, a common solution of gum arabic—"he could not tell precisely what quantity of gum should be dissolved in an ounce of water; he had tried to dissolve a certain quantity in an ounce of water, but (to his great surprise, apparently) a quantity of the water had evaporated by the time the gum was dissolved, and *therefore* he could give no definite proportions." These two solutions are to be mixed together in equal quantities, and after that a certain quantity of finely-ground carbon (in the proportion of one to eight of the combined solutions) is to be added to the mixture. The paper on which this is to be applied, should be what he termed "half-sized." The sheet should be laid on a glass plate, or some other hard and smooth surface, and a quantity of the solution poured on and allowed to remain on for about two minutes, after which it is to be brushed off with a "hog-hair" brush as cleanly as possible, and exposed under a negative in the usual way. After an exposure of an indefinite period, it was to be removed from the printing-frame, and immersed in water also for an undefined period, and finally washed under a tap.

After this paper had been "got through," the Secretary read a letter from Dr. Holding, who said he had purchased paper, carbon, &c. of Mr. Pouncey, and had followed his instructions; but the results (which he forwarded) were far from brilliant. There was nothing to tell him when the picture had been exposed enough; "but with certain modifications," &c. &c., it might become useful.

It was a great relief to the meeting when Mr. Malone replaced Mr. Pouncey at the table. Having cleared himself of the aspersions that had been cast upon him by the latter individual, he proceeded to place the subject of carbon *versus* silver printing on its proper basis. We regret that we have not space to give his remarks at length; but we may briefly say that they demonstrated that, inasmuch as a certain proportion of silver prints still exist unchanged after the lapse of so many years, it follows that there is no inherent cause of fading in the silver print, but that it must be attributed to imperfect washing, arising from the ignorance of photographers at one time with respect to the importance of freeing the picture from every trace of the hyposulphite of soda. He maintained that a silver print, carefully washed and preserved in a portfolio, where it could not be attacked by sulphurous vapours, was a permanent print; and he therefore warned photographers not to take up hastily a process because it was new, and which in its present state was undoubtedly inferior to the silver process.

Mr. Malone was succeeded by Mr. Shadbolt, who rose to reply to a charge made by Mr. Pouncey, that he, Mr. Shadbolt, had changed his opinion on the subject of carbon printing—or, as Mr. Pouncey poetically expressed it, "a change had come o'er the spirit of his dream." He did not deny that he had modified his opinion; circumstances had changed since he first expressed one on the subject. With a Machiavellian inspiration he sought to weaken the connection between Mr. Pouncey and his patron, by saying, in the most uncompromising manner, "that Mr. Sutton had done him, Mr. P., greater harm, both in opinion and fact, than any other person." He then pointed out in the carbon pictures one or two points in which they were inferior to the silver pictures from the same negatives, notably in the want of "atmospheric effect;" but there was evident, throughout his remarks, a desire to deal gently with the man upon whose process he had once looked so coldly; and eventually they finished by fraternising, the Dorchester lamb reclining beside the literary lion during the remainder of the evening.

The discussion was continued in a somewhat desultory manner. Mr. Pouncey stated that Lord Hastings had asked him if his pictures were well fixed, because he had a volume of the "Pencil of Nature," the prints in which had faded away; to which he replied, "I don't know, sir," or, "me lard," or something of that sort, "but I think my picters won't fade." He went on to say that it was admitted in an article on "Questionable Subjects for Photography," which appeared in a photographic periodical, that silver prints would fade; and he took this as an admission that silver prints were none of them permanent. Mr. Shadbolt, referring to the same article, said, that this statement "was a very loose statement of a very loose writer." It did not seem to occur to this gentleman that questionable photographs are, we are bound to believe, the work of questionable photographers, and that it is therefore wholly unfair to assume—that the observations which applied to such subjects are to be taken as applying to all photographs.

Mr. Malone was obliged to rise repeatedly during the evening to correct perversions of his statements by some of the speakers. Reference was also made by several of those who addressed the meeting, to the possible good results which might arise from the *sel d'or* process of toning prints. One of them, who expressed himself with much more common sense than grammatical accuracy, said that it had been tried, and with very satisfactory results. He also spoke very favourably of the daguerreotype process, and, remarking on the bluish tint which sometimes becomes visible on the plate when suspended over the fire-place, he said, that this tinge, which is due to sulphuration, may be removed with a little cyanide of potassium; and he asked, "has any photographer tried the effect of cyanide of potassium on a silver print?" "Yes!" exclaimed a voice. "What was the result?" he asked. "Out!" replied the voice. This very simple and laconic answer was received with a shout of laughter, which, at all events, gave satisfactory evidence of the condition of the lungs of the gentlemen present.

The President then rose, and, in a neat little speech, offered the thanks of the meeting to Mr. Pouncey for his paper; and also to Mr. Paul Pretsch for his kindness in being present with the intention of reading a paper on his process of photo-lithography; but as it was too late to read it then he trusted that that gentleman would read it at the next meeting.

Miscellaneous.

M. CORBIN'S DRY COLLODION PROCESS ON PAPER (VOL. I. PP. 182, 196.—The report of the committee, consisting of MM. Bayard, Alfred Coulon, Gabriel de Rumine, and Gaillard, appointed by the French Photographic Society to examine the dry collodion paper process of M. Corbin, is as follows: "Gentlemen,—Charged by you with the examination of M. Corbin's collodionised paper process, we have the honour to render you an account of our examination. Without entering into any details on the preparation and use of M. Corbin's paper, details which we find described by the author himself in the last number of the *Bulletin*, we have to inform you that the author has prepared and used his collodionised paper in our presence with complete success. A sheet sensitised the previous evening by M. Corbin was exposed for five minutes before a house illuminated by the sun, with an object glass 50 centimètres focus, and a diaphragm 12 millimètres in diameter. The proof was perfectly developed in about a quarter of an hour, without any spot, slowly and regularly. The negative, if it has not attained the delicacy of those obtained on glass, far surpasses, especially as regards dis-

tances, the best negatives on paper. In fact, as to delicacy, it appears to us in all respects similar to a negative on collodion transferred to paper. The time of exposure and of development are sensibly the same as for the Taupenot process. In conclusion, M. Corbin's process appears to us a great improvement as regards convenience in photographic tours, inasmuch as it allows of one carrying surfaces as sensible as the Taupenot collodion, capable of giving much finer proofs than paper, and that without the drawbacks inherent in the glasses on account of their weight, their price, the space they occupy, and their fragility. The committee proposes that you should thank M. Corbin for his communication." These resolutions were adopted. —*Bulletin de la Société Française de Photographie.*

Note to our Algerine Correspondent's Letter, Vol. I., p. 5.—In one of the early letters of the gentleman who has forwarded us several communications from Algeria, it was stated that several Arabs had been executed for the murder of the greater part of a family named Gilson. One of this family, the eldest daughter, he stated, had been frightfully mutilated, both of her hands having been cut off at the wrists, and her head nearly cleft in two, and that, notwithstanding, she still survived, and had been sent to a hospital in Paris. It gives us pleasure to announce that, Prince Napoleon's attention having been called to the circumstance, he has kindly taken the case of the poor girl into his consideration, and has, as we are informed, expressed his intention of providing for her for the remainder of her life.

The Crystal Medium.—Under the above name an enterprising firm are introducing talc, in the form of clear, thin pieces, for the purpose of superseding glass in the production of positive and negative collodion pictures. We think that this is a step in the right direction, as the employment of so flexible and tough a substance cannot fail to render the injury of valuable negatives much less frequent. Another useful application of this substance is pointed out in Mr. Browning's letter, published in this number of the "Photographic News."

Photographic Notes and Queries.

DETERIORATION OF GLASS BY EXPOSURE TO THE LIGHT.

Sir,—As some little stir has been made lately relative to the changes that glass undergoes by being exposed to light in operating rooms, the following facts may put the matter in another light, and go far to prove that glass is not so changeable as it is supposed to be. Three years ago I had built for me a small glass house here, and glazed the two skylights with the common 16 oz. sheet glass, with 12 panes 4 feet 3 inches long × 13 inches wide. In the first year portraits could be taken in 3 seconds generally; next year the time was increased to 6 seconds; and this year to 9 and 11 on clear days. As this was a serious inconvenience in taking babies' portraits, I had the glass well cleaned with whiting and water; but this produced no good result, and the time was still about the same. But now, being about to remove to another part of the town, I had the lights again cleaned, and this time with a strong solution of hot water and cyanide of potassium, well dried off with clean cloths, and this proved quite satisfactory,—the glass appeared clear as crystal, and on trying it at this time of the year, I find I can take portraits in 3 or 4 seconds. Thus I am led to conclude that the glass does not change, but acquires a thick deposit of organic matter, not removable except by some such powerful agent as that above mentioned.

Swansea. Thos. Gulliver.

PHOTOGRAPHIC DESIDERATA.

Sir,—As a practical photographer I feel persuaded that many beside myself have often regretted the results of working with porcelain baths and dishes, and yet it appears strange so few complaints have been made—too few, indeed, to induce the glass manufacturers of this country to turn their attention to the subject in a commercial point of view. I am perfectly aware cemented or *built* glass baths and dishes may be had by the shipload, but they are all liable to a serious defect—leakage, after some little service. The French cast glass baths and dishes are all more or less twisted, warped, and bulged, and necessitate the use of large quantities of silver solution. What photographers require are—well-moulded vertical glass baths of uniform thickness, not more than ½ or ¾ inch in *width* (to economise solution), and higher than usually made, to allow the fluid to rise without overflowing when the plate is immersed. All the glass baths I have seen are much too wide; the one I work with for plates 8½ × 7½, requires 40 ounces of nitrate solution to fill it properly. If *properly* constructed, half the quantity would suffice. Good, *flat*, well-moulded glass dishes are also much needed, with a spout, after the fashion of the little stereoscopic developing dishes, which are perfection in their way.

And, lastly, "a stereoscopic petzval lens" is a consummation eminently to be desired. All who have seen specimens of the working of the large lenses of this kind, will, I think, unite with me in the hope that some of our leading opticians will favour us with this boon "with the spring and with the flowers," and enable us to furnish the public with stereograms such as they or we never saw before.

George Eddowes.

TONING WITH PLATINUM.—PRINTING IN CARBON.

Sir,—May I ask whether bichloride of platinum might not be substituted for gold in the toning bath for paper prints? and if not, why not?

Platinum belongs to the same category of metals as gold, and, I should fancy, would be deposited like the latter on the surface of the altered chloride of silver; while in cheapness it has a very great advantage, being, I think, not more than 25*s.* or 30*s.* the ounce. No doubt, however, there are reasons for its non-employment, or we should have heard more of it ere now; but would you kindly enlighten my ignorance on the subject?

Might not waxed paper, or M. Gaumé's paper-glass be employed to receive the bichromate of potass and sugar, suggested by Mr. Mabley for carbon printing? The strong acid would then leave the lights uninjured.

Gwenthlian.

[Bichloride of platinum has several times been suggested as a substitute for the expensive terchloride of gold, but hitherto, we believe, the drawback to its use has been the inferior colorific properties which it possesses. We think it is a question which is well worth the attention of experimental photographers, and should be glad to hear of its being successfully solved. The suggestion as to the employment of a non-absorbent paper for carbon printing is good, and is well worthy the attention of those who are experimenting in this branch of printing.]

VARNISH FOR PAPER STEREOGRAMS.—ORMOLU FOR COLOURING GOLD FRAMES.

Sir,—I see two requests in vol. i., p. 191, of the "Photographic News" which I think I can assist in answering. The first is for a method of varnishing coloured prints. Take a flat camel-hair brush and pass over the print *once only*, and only one way, with a tolerably strong parchment size, missing between each stroke of the brush a space a little narrower than the breadth of the brush; put aside to dry, when quite dry size the intervening spaces which have been left in the same way as before; avoid having too much size in the brush, and pass over the print as lightly and quickly as possible. A second coat may be given when dry, without missing any part, as the first coat is a complete protection unless by too hard rubbing; after which, when quite dry, varnish either with mastic or dammar varnish. The cause of the appearance complained of is the varnish penetrating the paper,—the size prevents this. It may be got from any gilder for a mere trifle.

The second request, by a gilder, is answerable thus:—1 pint methylated spirits, ½ oz. orange shellac, ½ oz. seed lac, ½ oz. gum benzoin, dissolve and add to your ordinary finishing size; if too pale, add extract of either dragon's blood, red sandal root, or anatto, to the required tinge; if not flat enough, add more seed lac and gum benzoin. Strain through muslin before using. W. H. D.

Edinburgh.

NEW PRINTING PROCESS.

SIR,—I herewith forward you the particulars you were so kind as to solicit in a former number of the "PHOTOGRAPHIC NEWS."

1. Dissolve as much gelatine in a saturated solution of bichromate of potassa as will make a fine jelly when cold, the proportion of gelatine does not much matter; coat paper with this, and when dry expose under a negative in a printing frame.

2. After exposure, wash well till the whites show no trace of yellowness, then immerse in a saturated solution of protosulphate of iron. Wash and soak well.

3. Pass the print in a saturated solution of gallic acid, then lay it face upwards on a glass plate to develop. This facilitates the action of the oxygen of the air in giving better blacks.

4. When the print is still on the glass, pour over it some of the following solution:—Saturated solution of acetate of lead, with one-fourth of its bulk of glacial acetic acid. This solution improves the lights. There is no danger of over printing, and thereby producing negatives; the effect being the same as in a silver print.

Should the print be very dark, passing it in a very weak solution of nitric acid will lighten it very much, but it must be washed directly.

It may be as well to remark, that the more gelatine there is in the sensitising bath, the darker and the sharper will be the print. H. C. JENNINGS.

TRANSPARENT ENAMEL PHOTOGRAPHS.

SIR,—In vol. i. p. 177, you mention a process for which a Mr. Glover has taken out a patent; and as doubtless many of your readers may feel inclined to practise a similar mode of producing transparent positives without incurring the expense and annoyance of procuring a license, allow me to publish, through the medium of your columns, a process that for years I have been in the habit of printing, by superposition, similar transparent positives upon wet and dry collodion plates, upon the former by simply well draining upon blotting paper, and placing two slips of paper between the ends of the sensitive plate and the negative to prevent contact, exposing to daylight, or, what is better this dull weather and these long evenings, for a few seconds to a steady gas-light: develop with the usual iron or pyrogallic developing solution; after fixing and drying, back up with a good white enamel paper, or with a thick solution of white shellac in spirits of wine, containing a portion of precipitated chalk.

It is of course self-evident that a dry plate will give a sharper picture, and that it is also more readily manipulated than a wet one; but by using thin paper to prevent the negative touching, I do not find in practice any apparent difference between the two. P. COOKE.

Upper Seymour Street, Euston Square.

CEMENTING GLASS TOGETHER.

SIR,—In answer to your wish for information from some of your correspondents on cementing glass together, I would advise the employment for that purpose of *pure white* shellac—sold in sticks, somewhat similar in appearance to barley-sugar—instead of marine glue.

It can be very efficiently applied by first making *hot*, over the flame of a spirit lamp, both the pieces of glass to be joined together; then burning the shellac in the flame, and applying it to one of the pieces of glass—just as sealing-wax is applied to paper—and rubbing them both firmly together for a few seconds, and letting them remain still till quite cold, when the union will be perfect, and, as far as I have found, much firmer and more enduring than if effected with marine glue. W. G. G.

CEMENTING GLASS TOGETHER.

SIR,—With reference to your reply to "Y. Z." in No. 17 of the "PHOTOGRAPHIC NEWS," there is no doubt that marine glue is (as you say) the *best* cement for joining glass. Where this cannot be got (as is the case in this town), I have found a strong solution of shellac in alcohol to answer very well, with careful usage. It is perfectly water-tight, but will not bear very rough handling. It should be applied to the edges or surface of the two pieces of glass, as the case may be, and then held close to the fire until thoroughly hot; press the pieces together firmly, and when cold, if air bubbles have been avoided, it will be found to adhere very closely. E. S. C.

PRINTING ON IVORY.

Several inquiries having been made on the above point, we should feel obliged if any correspondent who is in possession of a good method would favour us with the details.—ED.

SYNOPSIS OF PHOTOGRAPHIC PROCESSES.—FOTHERGILL'S.

Clean plates.
Coat with collodion; let well set.
Place in bath ½′ to 1′; get rid of oiliness.
Wash gently on a levelling stand with water, 4 drachms, 15″ to 20″.
Pour albumen on and off several times.
Wash in a well dish with two changes of water ½′ each.
Dry.
Expose.
Moisten with water.
Develop, 3 drachms of A to 1 of B.
Wash.
Fix.
Wash.
(The above quantities for stereoscopic plates.)

Albumen:—

White of egg	... ...	1 ounce.
Liquor ammoniæ	... ...	7 minims.
Water	... ...	1 ounce.

Developing solutions:—

Pyrogallic acid	... ...	1 grain.	A
Glacial acetic acid	... ...	20 minims.	A
Water	... ...	1 ounce.	A
Nitrate of silver	... ...	4 grains.	B
Water	... ...	1 ounce.	B

Fixing solution:—

Hyposulphite of soda	... ...	2 drachms.
Water	... ...	1 ounce.

H. S. I.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not shake the camera when removing the cap from the lens.

Do not look at the sitter when taking a portrait.

Do not be hasty in observing an alteration of colour in test paper.

Do not pour on collodion near a naked flame.

Do not keep sensitive positive paper unused longer than possible.

Do not use rain or common water for preparing the nitrate bath.

Do not print on positive paper until it is quite dry.

ANSWERS TO MINOR QUERIES.

COLOURING PHOTOGRAPHS.—*A. H.* In attempting to prepare his own colours for dry tinting, our correspondent will meet with more difficulty and less success than he probably anticipates. It is not sufficient that the pigments be comminuted to their utmost fineness; other treatment is required to make them adhere well to the plate, and different pigments require different modes of treatment. The waste from repeated failures would probably make the experiment an expensive one. It is not absolutely necessary, however, to procure a full complemnet of tints at the outset. We subjoin a dozen, with their names and numbers as classified in the list we use, with which a very good commencement may be made:—Flesh, dark, No. 1 and No. 2; complexion, No. 1; carmine; blue, No. 2; green, No. 3; damask; brown, No. 1; violet; horizon; silver gray; and gray, No. 4.

FILTRATION OF FINELY-DIVIDED PRECIPITATES.—*S. Johnson* has prepared some metagelatine by the plan recommended in vol. i. p. 202, by Mr. Heisch, with some slight modifications; he has heated the glue and dilute sulphuric acid together for the time there recommended, but afterwards, for the more complete separation of the sulphuric acid from the liquid, has saturated the acid by adding precipitated carbonate of baryta, until effervescence has ceased. This he has attempted to filter through bibulous paper, as recommended; but after several times passing through the very finest paper he can procure, it still comes through milky. The cause of this is, that the precipitated sulphate of baryta is a powder of such exceeding fineness that it is not arrested by the pores of the filter paper. In chemical experiments this difficulty is a serious inconvenience, as some of the most usual methods of quantitative analysis depend upon the absolute separation by the filter of the precipitated sulphate of baryta from the solution, and several plans are in use for causing the sulphate of baryta to cohere together in larger particles; but these would be inapplicable in the present case. The following plan is easy to perform, and will be found to answer perfectly:—Filter through ordinary coarse filtering paper, in order to separate the bulk of powder from the solution; allow the filtrate (which will be milky) to get almost cold, and then add three drops of white of egg to each ounce of solution; shake up well together, and then boil violently for a few minutes; the albumen will coagulate in the liquid, and will carry down with it the whole of the finely-divided suspended sulphate of baryta. The liquid will now filter with the greatest ease and rapidity through the bibulous paper, and will yield a perfectly bright filtrate.

TER-CHLORIDE OF GOLD.—*F. M. Y.* To prepare this salt place a piece of metallic gold in a flask, and pour over it a mixture of two parts of hydrochloric acid and one of nitric acid—both pure and strong, heat gently, when the action will soon commence. If effervescence ceases, add fresh acid until all the gold is dissolved; then evaporate in a water bath nearly to dryness; moisten with pure hydrochloric acid, and evaporate again to dryness, and then preserve in a well-stoppered bottle for use. It will be a reddish orange mass, very deliquescent. It will therefore be better to keep it in solution, of such a strength that one drachm of liquid shall contain one grain of terchloride. If the weight of the gold originally taken be known, and the operation be conducted without waste, the amount of terchloride obtained can easily be calculated without being at the trouble of weighing this deliquescent salt; ten parts of metallic gold will produce about fifteen of ter-chloride of gold.

FORMATION OF A PHOTOGRAPHIC SOCIETY.—*P. S.* and some friends wish to establish a photographic society in their city, but do not know how to begin. We shall be very happy to render all the assistance in our power to any persons wishing to effect such an object. In our opinion, the best mode of operation would be to talk the matter over with private friends until the preliminaries were agreed upon, then to form themselves into a provisional committee for the purpose of agreeing upon a set of regulations, &c., and then to call a meeting on a certain day, by advertisement or otherwise, of all persons desirous of forming a photographic society. The meeting having assembled, one of the provisional committee should briefly state the object of the meeting, saying that such and such gentlemen had agreed upon certain regulations, and then submit them to the meeting. Some one else should then propose that the rules be adopted; and then, after electing the officers and council, the formation of the society will be *un fait accompli*. We shall be very happy to look over a set of the proposed rules, if our correspondents think that our experience will be of service to them.

PRESERVATION OF DRY COLLODION PLATES.—*C. Buxton.* It will not be safe to store dry plates away in deal boxes, as the turpentine effluvia always hanging about the wood will be liable to cause fogging. Good tin boxes can now be procured at a small cost at most photographic instrument makers, and should be used in preference to deal.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. E. N.—The principal advantage which a view lens possesses over a portrait combination is the comparative cheapness; a single lens covering a 10 × 12 field can be purchased for £5 or £6, whilst a double combination to cover an equal extent, would cost nearly six times that sum. Besides which there is a danger of centralisation of light in the picture; whilst the greatly increased weight and bulk of a large double combination would render a photographic tour, with such a companion, a formidable undertaking.

P. S.—No really practical panoramic camera has yet been devised. 2. *Instantaneous* photography requires the lens, light, and chemicals to be at their best. Wet collodion must be used, and the lens should have a short focus. 3. It is incorrect in principle.

J. H., Junr.—We do not think any plan will be available for restoring negatives which have become scratched. If the marks are not in very conspicuous places you might, perhaps, manage to touch them with a little paint so as to partially remedy the defect.

J. J. D.—We are much obliged.

L. W. B. W.·H. H.—1. To prepare a good dead black paper, coat it with a mixture of very thin glue and lamp-black applied hot. 2. Use a rather stronger iodised collodion.

J. BELL.—Write to the publishers.

S. E.—Professor Wheatstone, the greatest living authority on such matters, has mentioned to us that the two positions of the camera in taking stereograms should not form any angle with each other; but that the two positions or two lenses, if a twin lens camera be used, should in all cases be strictly parallel. This will cause any particular spot in one view, not at a great distance off, to occupy a different position on the ground glass when focusing for the other view.

T. J. D.—Have you tried your proposed funnel? We hardly think it would be so successful in practice as you think.

J. L. D.—The best formula we know of is the one given in vol. i. p. 66. You will observe that most of the solutions are alkaline. We do not think your *old* toning bath can be made available for further use; do not, however, throw it away, as we hope shortly to give a plan for recovering the precious metals from such solutions. We have not tried Mr. Nevile's process yet, but should think from the description that it would be about as good as—neither better nor worse than—any of the score of changes which have been or will be rung upon the chemical bodies at present in the hands of photographers. It reminds one of a remark we once heard made on taking medicine—"putting substances that we know nothing about into something that we know less about." If you wish to try it, use one grain of citric acid to the ounce.

E. S. C.—It is our intention to do what you ask, but possibly some time may elapse first.

A LOVER OF PHOTOGRAPHY.—The address of the Photographic Society of Ireland is, Royal Dublin Society House, Dublin. The address of the other is simply the name of the town. Neither publish journals.

T. COLLINS.—1. It will be attended to in future. 2. Place the stop *close* to the front lens, either in front or behind.

S. Y.—1. You must be mistaken as to the firm you mention saying that there is no such thing as chloride of cadmium. It is a well-known definite salt, and is or ought to be kept at all dealers in photographic chemicals. 2. Place a small piece of clean zinc in your red collodion.

J. E. K.—Your silver bath is not strong enough. Your other pictures do you great credit.

F. L. G.—The toning bath prepared with iodine is radically bad, and we advise you to have nothing to do with it. We do not know how the pictures you mention are prepared.

J. C. W.—Try the collodio-albumen process. We have attended to the other matter by post.

Communications declined with thanks:—J. R.—Joynson.—F. P. P.—T. L. M.—Rosshire.—An Amateur.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—C. K. D.—A Working Man (see our Notes and Queries). A. B. C.—H G.—A. N.—Suffolk.—A Correspondent whose signature is perfectly illegible.—O.—A Tyro.—T. J. M.

IN TYPE:—J. M.—W. D.—T. W.—J. T.—R. W.—H. E. N.—H. S.—Norma.—Viator.—An Amateur.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

⁂ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 19.—*January* 14, 1859.

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

In the early days of photography, the exhibitions of this society had much more interest, for the scientific photographer, than they possess now. This was in a great measure owing to the uncertainty with which experimenters worked,—no process being then known which had all the requisites to enable the photographer to produce a satisfactory picture. Collodion was in its infancy, and thus, as a consequence, every photographer tried his own peculiar "process;" and it was not until he had sent his pictures to the exhibition, that he was enabled to see whether the results of his own method were inferior, equal, or superior to those of others. As gradually the capabilities of collodion were developed, a change has been perceptible in the character of the exhibitions. Photographers now seem pretty well satisfied of the superiority of that process, and the result is, that the majority of pictures exhibited are collodion. The attention of photographers has thus been turned from the chemical to the artistic department of the science; each photographer has endeavoured to surpass his competitor in beauty of manipulation, which, combined with great artistic talent in many instances, has given to photographic exhibitions more *public* interest; for it is well known the public generally care little about this or that process, so long as they are presented with pictures that are interesting or pretty. To this, then, we may attribute the rapid advancement which has been made of late years in the artistic department of photography. Now we would not for one moment attempt to underrate the great importance of art in connection with photography, for we are convinced that it will ultimately prove of such service to art, that it would appear enthusiastic and utopian to prophesy on the subject. But at the same time we feel that our particular mission is not so much the promotion of art, as the promotion of photography,—chemical photography, whereby we may obtain greater and more satisfactory results than we have hitherto done. As we have on other occasions remarked, we do not see that the society has done much for the advancement of the art, nor do we think that it is in its power to do so; but still the course which it at present pursues is the one least calculated to do this. For it will easily be seen from the foregoing, that with each succeeding exhibition there should be some change. Photography is making too rapid advances to allow of our pleading what was done a twelvemonth ago, as a precedent for present action. We have shown how the character of each exhibition has changed, until we have now only a repetition of preceding exhibitions. The present course of exhibiting nothing but pretty pictures, is merely doing what any enterprising publisher could accomplish—it is, indeed, only acting as a large rival publishing establishment, with all the advantages accruing from an associated body of gentlemen. What we wish to see in such exhibitions is, not merely a great trading establishment and gigantic advertising medium, but some amount of scientific information in addition to all these pretty pictures. How this can be done, will be seen with a moment's reflection. There is no denying the fact, that the society has at its disposal means which might enable it to collect specimens of all the discoveries, important or otherwise, which are every week being made public. No private person could hope to accomplish this; and therefore it is undeniably a duty incumbent upon the society, if it has not departed from its avowed object, viz., the promotion of photography. As an instance in point, we may mention that there is a strange omission from the present collection—there is not a single impression of Mr. Fox Talbot's photoglyphic process; although we have several by Mr. Paul Pretsch of an old process, which is confessedly inferior to Mr. Talbot's in its capabilities, and so near it in scientific principles as to be regarded by many as an infringement of that gentleman's patent: this, surely, should not be the case with a process, which promises one day to be the leading feature of photography. Photographers who visit these annual exhibitions should be assured that there is really something to be seen which would repay a visit. As to the scientific applications of photography it would be needless to recapitulate them here, as there is no science to which it cannot be applied in all the details of each branch. In these exhibitions, specimens of the application of the art to all the various sciences should be displayed. Astronomy, meteorology, chemistry, geology, optics, electricity, crystallography, botany, natural history, are all indebted to this wonderful art; and, surely, specimens of such applications as these—pictures which show the ingenuity and power of the intellectual class of photographers—deserve some little space side by side with pictures which are, in fact, nothing more than testimonies to the excellence of the optician, cabinet-maker, and collodion manufacturer, and whose only merit consists in being pretty.

The exhibition opened to the public on Saturday last, the private view being held on the preceding day. Compared with the last exhibition, it is infinitely superior to it; but compared with that held at the South Kensington museum, it is inferior both in quantity and quality. Perhaps nothing so forcibly illustrates our opening remarks on the neglect of scientific photography as the case of M. Burnet, who has a series of pictures illustrative of new, and probably important processes—the "cuprotype" and "uranium" processes. There is more real intellect required for the production of pictures of this kind than for all the other pictures in the exhibition put together. Number 384 is a specimen of the cuprotype process, no silver being employed. The photograph is not first-rate, but in it we see promise of future success. Numbers 385, 386, 387 are by the uranium process, and are admirable specimens of the capabilities of this new branch of printing. Number 388 is on a paper prepared by fluoride of uranium, and developed by ferri-cyanide of potassium; it is a picture of a bas relief; in it there is almost everything that could be desired as far as regards the rendering of half tints and clear detail: indeed, the whole of this series cannot prove otherwise than interesting to the scientific photographer. For our own part, we would rather see these crude attempts than the whole room full of mere pretty pictures; and more fully to show the justice of our preliminary remarks, we find these important prints huddled close to the ground in an out-of-the-way corner of one of the small rooms, and, what is worse still, without a single line of description in the catalogue. So that, unless the spectator has unusually sharp eye-sight, he would in all probability miss seeing them, and the casual visitor would only pass them by as very bad pictures, never for a moment reflecting on the importance of such discoveries as these to future photography.

The leading pictures in the collection are the reproduction of the cartoons of Raffaelle at Hampton Court, by Caldesi and Montecchi, and by C. Thurston Thompson, for the department of science and art at South Kensington. The

thanks of the photographic and artistic world are due to the former gentlemen for the enterprising manner in which they have placed before us such an excellent series of the reproductions of great masters, both ancient and modern.

We understand that this undertaking has for many years been a long-cherished idea of this firm, and it has only been by great perseverance that they have overcome obstacles which seemed almost insurmountable. In their first application to her Majesty's government—which took place six years ago—for permission to copy these great works, they were not successful, as the government of the day was afraid that, in the removal necessary for photographic copying, they might possibly get so damaged as to deteriorate their value, which, we need hardly say, would be a national loss. However, they pushed their suit with succeeding governments, and the result is the series before us. We may mention incidentally that, in the necessary removal of these cartoons, happily they did not receive the slightest injury. But the preservation of the originals will be a matter of less actual importance now we have such admirable transcripts as these. No doubt her Majesty's government were induced the more readily to grant permission to photograph these cartoons, from the very importance of the subject, because it must be apparent to everybody, that the object to be gained was in every way worth the risk incurred in copying the cartoons, as the originals are in a most dilapidated state. They were cut in several places as guides for the Flemish weavers, and afterwards pasted together; but owing to their great age they are gradually becoming more indistinct; so much so that they are now to be placed under glass, from which they cannot in future be removed. When works of such importance are decaying, nothing could be more opportune than photography to redeem them from oblivion, with a fidelity far beyond any other mode of transcription. Perhaps there is scarcely any set of pictures so well known, and yet, at the same time, in such request. There have been copies innumerable taken of these cartoons, from the plain wood engraving, and cheap coloured lithograph, which have adorned the walls of the village school; or the still more elaborate etchings which are used to illustrate the "Diamond Testament." Who does not remember the picture of "Paul preaching at Athens," or "Our Saviour's Charge to Peter," or "The Miraculous Draught"? We should think that there is scarcely a reader of the "Photographic News" who is not acquainted with these pictures. They have been engraved many times; but the engravings will by no means bear comparison with the photographic copies.

We might enter at length into the comparative merits of engraving and photography; but that would demand more space than we have at command: however, we shall in a future number revert to the question. The whole series of photographs is much more interesting to us than the great faded originals; for, by means of photography, we have them reduced to a plain black and white tint, whereas, in the originals, there is such a feeble colouring, that it is rather painful than otherwise. Every one of these copies is distinct and clear; and what in the originals appears misty and confused, is striking in these. There is a great nicety of half tint, which is more perceptible than in the case even of a highly-finished picture. This is attributable to the absence of that combination of colouring, which is often the picture-copyist's bane, as we pointed out in vol. i. p. 61. It would be almost superfluous to select any one of these pictures, as there is, so to speak, a photographic sameness in them. There appears a great uniformity in the negatives —a point of importance to those who are desirous of having a set of the seven, as it is at all times desirable to have the photographs of a series as much of a tint as possible. Of course the size of the photographs varies according to the proportions of the original cartoons. There are four sizes of cartoons: the largest is forty-four inches by twenty-eight inches. This is taken in two pieces, and joined in the middle. The joining is not perceptible, inasmuch as there are several joinings in the original, which show strongly in the copies; and, as we remarked before, the uniformity of the negatives as regards colour enables the mounter to join them in such a manner as to render it impossible, except upon close inspection, to detect the juncture. This is an important feature in all large photographs where joinings have to be made.

To artists and connoisseurs, perhaps, the most interesting thing will be the studies of the principal heads and figures in the cartoons. For the use of those who may wish to study the forms of Raphael in detail, and to art collectors, these will prove invaluable, as, by this means, they will be enabled to see in detail the important portions of these cartoons. It will be seen, on comparing the sizes, that these are on a large scale, and we may state that each head is about eighteen inches by fifteen, while the whole picture of the middle size, which is a large photograph, is only twenty-nine inches by eighteen. We have heard of an ecclesiastical dignitary of the Roman Catholic Church who is an eminent art connoisseur, and who has so studied the works of this great artist, that he can take a magnifying glass and go over one of his masterpieces, and point out where Raphael has laid on his brush, and where his pupils have painted. These studies would enable any such microscopic admirers of the great Italian to pursue *ad libitum* such observations.

After the photographs of the Raffaelle Cartoons, perhaps the next most important picture in the collection is the large view of the Crystal Palace by P. H. Delamotte (169). It is in three pieces, and is taken from the central nave. The effect is very fine, as there is great uniformity in the tone of the picture; and the play of the shadows, as they appear here and there through the picture, is very pleasing; the detail of the foliage is also good. In some instances, however, the perspective is bad; and the three pictures, which are here united into one, should have been taken from the *same* spot by merely rotating the camera on its axis, and not from *different* places. Had this been done, the effect would have been perfect. One thing we particularly admire in connection with this picture, is, the candour with which the photographer states all the means employed to obtain such a pleasing result. The names of the manufacturer of the collodion, and the maker of the lens, are here made as prominent as that of the manipulator. We should like to see this plan adopted in all cases, as very valuable information would frequently be thereby afforded.

(To be continued.)

THE MOLECULAR ACTION OF CRYSTALLINE PARTICLES.*

BY DR. A. WELLER.

A few days' stay at the convent of St. Bernard gave me an opportunity of repeating the observation on the clouds as mentioned by De Saussure, which may be also made at this season on our London fogs: globules of various sizes in these circumstances are frequently discerned by the naked eye floating in all directions. I have endeavoured to ascertain their vesicular structure, but have been unable to do so from direct observations. It is frequently a most difficult point, in microscopic investigation, to decide upon the existence of a thin transparent membrane; it is still more so to pronounce upon the vesicular or spherular structure of globules in constant agitation; and I believe that if minute spherules and vesicles could be mixed together, we do not possess any means at present of distinguishing them. I have never been able to detect that appearance of bursting of the globules mentioned by De Saussure, but sometimes, when the agitation of the air is slight, two of the larger globules may be seen floating towards each other, and afterwards disappearing suddenly, which may be explained, if we

* Continued from page 207.

admit that this bursting is caused by the union of the two spherules into one, which is too heavy to remain any longer in suspension, and whose rapid decomposition conceals it from the sight. There may be urged as objections to the vesicular theory that, if the pellicle became extremely thin, the vesicle would no longer be perceived any more than the apex of an air bubble before bursting, or the central black spot of a system of Newton's coloured rings. It will be seen below, that the globules of vapour possess the power of depositing themselves in a crystalline form, which requires a tranquil deposition of particles, such as could scarcely be deemed possible if the air contained in each had to escape at the moment of its crystallisation. I have endeavoured to fix the globules of water on glass and other substances, so as to be enabled to submit them to microscopic inspection; but, from their volatile nature and other causes, I have not succeeded: however, it is easy to do so with almost any other volatile substance; and I have examined several in this way without detecting the slightest appearance of a vesicular structure. Mercury is deposited under the form of globular particles, with a metallic lustre, whose diameter is 1·500th of a millimètre, in which I have never detected any internal cavity by the most careful examination. Flour of sulphur is found to consist of solid globules, several of which adhere together; when acted upon by a gentle solvent their external portion is dissolved, and there remains a regular octahedron. An interesting experiment may be made on the fumes of sal-ammoniac, which appears whenever muriatic acid and ammonia are brought together. Two small phials, each containing one of these substances, are covered by an inverted tumbler; above the surface of the acid are seen, at a short distance, the fumes of the salt, which, at the end of a few hours, are found to be condensed into a thin snowy pellicle, completely obstructing the mouth of the bottle. This partition is so delicate, that the slightest agitation will cause it to fall into the liquid. In all these cases it is found, that the fumes possess the power of remaining suspended a greater length of time than would be expected from the difference of their specific gravity with that of air, which is also the case with the fumes of other substances, and smoke in particular. This can only be accounted for by the continual state of agitation of the air, even within an enclosed space, and by the elasticity of the solid and liquid particles. In the case of solid particles this can be readily admitted, but with regard to liquid globules, there is probably some action similar to that which takes place on the impinging of solid elastic balls, which, after becoming flattened, rebound on account of their tendency to recover their original shape. The causes which act in fixing different vapours and fumes are the same as those which determine the precipitation of solid particles in solution; such as, for instance, sharp points of any kind, minute filaments, and, more especially, the existence of a crystalline particle to act as a nucleus. Non-conducting substances, as woollen cloth, the nap of a hat, the web of a spider, &c., are covered with aqueous globules when no rain has fallen, and when polished surfaces near present no such deposition.

Having now shown the existence of a crystalline power in vapours, we shall proceed to prove the influence of a force which disturbs the equilibrium in the same manner as in the saline solutions above mentioned. The friction of a solid body on glass will leave traces which are invisible until breathed upon. Many bodies possess this property, but the mineral steatites or soapstone produces the effect better than any other I know. A considerable degree of friction may be used over the traces thus produced by steatites, without affecting the appearance of the traces when breathed upon repeatedly. The glass may even be heated considerably without affecting them. By examining with the microscope the parts which have been traced upon by steatite, we are unable any more than with the naked eye to detect any material cause for the deposition of vapours in these places, as it probably depends upon the transparency of the mineral which, being so attenuated, is unable to affect the rays of light. When the traces have been brought out by breathing upon them, they must be covered by another piece of glass, which impedes the evaporation of the water, and allows them to be submitted to the microscope. The parts untouched by the steatite present the appearances that have been already mentioned. On the lines created by the mineral the drops of water are differently disposed, their long diameters being parallel to the direction of the lines. These minute drops very much resemble the globules of gas deposited from a liquid; the only difference between the two consisting in the deviation from the globular form in the liquid traces, which evidently arises from the power which the water possesses in wetting the glass. It is evident, therefore, that the secondary cause of these images is, a difference in the position of the minute drops of water, reflecting the light differently from the other drops which are irregularly disposed on the other parts of the glass. There exists another method of fixing vapours which has been long known, and to which, I believe, attention was first directed by Professor Draper. It consists merely in placing a body upon a plain surface, such as that of a metallic speculum, or even of glass; after a short time it is found that simple contact such as this has caused some molecular action, as the spot occupied by the object will become apparent by breathing on it in the same way as with the images of a steatite. This observation is the more interesting, as it serves as a connecting link between the effects of mechanical power, and those caused by other agents. The experiments of Mr. Hunt have shown the influence of heat in causing the fixation of vapours. An image of this sort formed on glass by the breath, when examined under the microscope, presents exactly the same appearance as that formed by steatite. The same difficulty is experienced in bringing out, by means of mercurial vapours, the thermographic images on glass, as is found with the traces of steatite, which possess, in a very slight degree, the power of fixing mercurial vapours. It appears, therefore, that the power that water has of wetting glass, causes it to have a greater tendency to deposit than mercury, which does not wet glass. The cause of the production of thermographic images is evidently similar to that which causes the deposition of a solid body from the solution.

(To be continued.)

OF THE CHEMICAL INFLUENCE OF LIGHT ON CERTAIN BODIES.

BY M. E. CHEVREUL.

THE following was read at a recent meeting of the *Académie des Sciences* by one of its most distinguished members—M. Chevreul:—

The numerous researches which have been made into the action of light on substances, from a chemical point of view, have induced me to think that a note added to the last two papers of M. Nièpce de St. Victor, for the purpose of establishing that which is new, and pointing out the question to which they lead, would not be wanting in interest.

It is important, first of all, to signalise two circumstances in the chemical action of the light; 1. that when, acting alone, it decomposes a body or operates the combination of two bodies; 2. that, when it acts concurrently with a body on a complex body. This distinction is perfectly justified by the following facts:—

Of light acting alone, either to decompose a body, or to combine two bodies.

1. Auric acid exposed to light in a vacuum is reduced to gold and oxygen gas.

2. Prussian blue, under the same circumstances, loses its blue colour in losing its cyanogen; but the separation of the cyanogen is not complete, like that of the oxygen from the auric acid. However this may be, the light acts in these two cases, as a reagent in eliminating the electro-negative from the electro-positive body.

3. The light of the sun determines the instantaneous union of chlorine with hydrogen.

Light acts concurrently with a body on a complex body.

If, relying on previous statements, we adopted the generally received opinion, that light alone suffices to alter a great number of coloured substances, notably a great many of those stuffs which are dyed, we should deceive ourselves greatly; for the researches which have occupied me more than ten years, and the results of which are recorded in the *Memoires de l'Académie*, incontestably prove that the greater part of the alterations of which I speak arise, not from the action of the light alone, but from the simultaneous action of light, oxygen, and the vapour of the atmosphere, in such a way that dyed stuff, alterable in the air under the influence of the sun, would not have altered in the same time if it had been exposed, on the one hand, to the air in a dark place, or, on the other hand, in the luminous vacuum.

1. (*a*) Archil, turmeric, anatto, &c., &c., resist the action of the light in a vacuum:

(*b*) They resist the air in obscurity:

(*c*) But they are altered if, exposed to the oxygen of the atmosphere, they receive at the same time the action of the light.

2. Colourless organic matters, under circumstances in which coloured organic matters change, do not resist the causes of the alteration of the latter. I may cite, in support of this, the example of the destruction of the gelatine size of the paper, mentioned by me in 1837, and again by M. Nièpce de St. Victor, in his last paper *apropos* of the starch size, a destruction which is much more rapid than that of the gelatine.

I have found that, under the influence of light, cotton enclosed in confined air with baryta water, though not in contact, changed with the production of carbonic acid gas.

Chlorine water used in bleaching attacks colourless as well as coloured substances, and, for this reason, I have regarded bleaching differently to what it had been previously.

3. I demonstrated the influence which the stuff exercises on the stability of different colouring principles therein fixed.

Anatto is more stable on cotton and silk than it is on wool.

Archil is more stable on silk than it is on wool and cotton.

Sulpho-indigotic acid is more stable on silk than on wool and cotton.

In dry air, on the contrary, indigo is more stable on wool than on silk.

I have verified the effect of a screen in preventing the influence of the light on a body exposed to the air. I have shown how the intervention of a glass weakened the action of the light on coloured objects. I may mention here the following experiment:—A white design on the border of a curtain, the ground being of indigo, allowed the light to pass through it, and, consequently, with the oxygen of the atmosphere, to reproduce itself by eating into the indigo colour of the curtain, while the coloured ground of the border prevented the transmission of white light, and thus preserved the colour of the part of the curtain immediately beneath it.

I recall this example, because the result of the experiment was laid before the Academy on the 2nd of January, 1837, that is to say, before Daguerre communicated to the Academy, through Arago, the photographic processes he published under the joint names of himself and Nicéphore Nièpce. I may mention an example of a similar kind, which has been communicated to me by M. Herlemont, *communal instituteur* at Gentilly. A document printed in a bistre colour on a white ground chanced to be exposed to the light, having beneath it a rose-coloured paper. That which happened in my experiment was repeated in this instance with perfect distinctness. It is evident that the document in this case acted the part of the negative of which we hear so much now-a-days in photographic processes. It was the experiment published on the 2nd of January, 1837, which led me to show that in the process of M. Nicéphore Nièpce, in which a metallic plate covered with a layer of bitumen of Judea received the contact of the light in a camera, the image developed is an effect that the oxygen of the atmosphere exercises, under the influence of light, on bitumen. In consequence of this action, the insolated bitumen having become insoluble, it is possible, by means of solvents, such as naphtha, oil of lavender, &c., to remove from the plate the non-insolated bitumen, and thus obtain the image traced in insoluble bitumen.

According to the preceding, two classes of phenomena are produced by light alone, or with its assistance, in the actions that we term chemical.

1. It acts alone, and produces in the vacuum either a radical decomposition like that of auric acid, or partial as in the case of the Prussian blue, or a combination like that of chlorine with hydrogen.

2. It acts on one or several bodies with the assistance of a gas; for example, with that of gaseous oxygen, or dry or humid coloured substances.

(*To be continued.*)

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

Of the Influence of the Strength of the Bath—(continued).—When the nitrate is mixed with the chloride, the effect of the rays is no longer the same. The first of these salts retards, in fact, the action on the second, which explains the retardation in the appearance of the proof; but, besides the chloride, which reduces itself, it forms immediately a new quantity that the light may attack, because before, in the condition of a nitrate, it occupied a proper place, and, consequently, now in the state of chloride it is not yet covered by a film of reduced silver; hence, in a given thickness, there is a greater quantity of chloride of silver, consequently of reduced silver, and, consequently, a greater intensity.

Beyond this, in the case of albumenised papers, another cause intervenes; the albuminate of silver, which also possesses the property of being impressionable under the luminous action, brings to the *ensemble* the vigour and colouring which characterise it.

It does not follow from this that a sheet of paper impregnated with nitrate of silver alone—an albumenised sheet especially—cannot give a proof. We will take this fact into consideration when we come to the subject of insolation.

This first fact established, let us consider the red colouring that proofs present, with the greater intensity in proportion as the quantity of silver they contain is less. Our preceding researches on the action of the sizings, will assist us in explaining this.

We have shown that the more abundant the sizing, proportionally to a quantity of silver, the redder the proof. Now these two elements—silver and size—being brought in the presence of each other, the size being augmented, or the silver diminished, the result will be evidently the same. We had on our first sheet a certain quantity of size, plus 0·467 grammes of silver; on the third we had the same quantity of size, plus 0·876 grammes of silver, almost double the former quantity. In the first, what happened? The greater part of the silver combined with the size, and, consequently, the proof assumed the tone with which we are familiar; in the third, on the contrary, the silver being in too great abundance for the size present to be able to satisfy the combination, the result was a certain quantity of uncombined silver, which communicated to the *ensemble* a little of the black tint which characterises proofs obtained on paper without size.

Let us recall here that these results agree with that we

* Continued from p. 206.

have already established for the variation in the quantities of chloride. We have demonstrated, in fact, that, in a given paper, the less chloride there was (within a certain limit) the redder the proof; and that when the proportion was augmented, the proof was more coloured, but quitted the red tones to assume black and opaque tones. Now, the richer a sheet is in salt, the richer it becomes in chloride by sensitising.

Thus, in this case also, one cannot advise one strength rather than another; one can only point out a medium—15 per cent.; but one may state, in an absolute manner, the influence which a greater or less richness of the silver bath will exercise. For soft negatives, giving habitually veiled positives, the bath ought to be more concentrated; for negatives furnishing vivid contrasts, it ought, on the contrary, to be more feeble. It is a sort of photographic palette in the hands of the artist; it is for him to know how to employ the tones, according to the exigencies of his negative.

The results we have announced will maintain themselves in a constant manner if the silver bath prepared in the given conditions be retained at a constant richness. But all photographers know with what rapidity the value of the paper prepared successively on the same bath decreases, and all have seen that this rapid decrease arose, in great part at least, from a diminution of this richness.

Analysis fully confirms this view, and shows that, in preparing even a limited number of sheets in the same bath, the bath is not deprived merely of a quantity of silver proportionate to that of the vanished liquid, but of a quantity much more considerable.

When a sheet is placed on the bath, the nitrate that this contains finds itself in presence of three distinct elements:—the fibre of the paper itself, the salt previously introduced into it, and the size with which it is covered. Let us examine in succession the influence of each of these elements; and let us mention, now, that the results we are about to announce—general in their principle, *the impoverishment of the bath*, become variable in their relative proportions according to the nature of the product employed, and cannot, consequently, be explained in absolute values.

In all the assays which follow—and to put ourselves in as general a position as possible, we employed papers of the same make—we ascertained that a salted and albumenised sheet of paper measuring 44 × 57, submitted to a bath of 15 per cent., formed of 100 cubic centimètres only, took up only 8 cubic centimètres of liquid on an average, and 3·76 grammes of nitrate of silver. Now, according to the strength of the bath, these 8 cubic centimètres ought to have contained only 1·20 gramme of nitrate of silver; then $3{\cdot}76 - 1{\cdot}20 = 2{\cdot}56$ grammes, have been taken from the remaining liquid, and this, previously formed of 100 cubic centimètres of water and 15 grammes of silver, is now formed of 92 cubic centimètres of water and 11·24 grammes of nitrate, or, in other words, its richness has descended from 15 per cent. to $\frac{11{\cdot}24 \times 100}{92} = 12{\cdot}2$ per cent.

The rapid impoverishment of the bath is thus made evident, since one sheet alone of ordinary paper suffices to lower it from a bath of 15 per cent. to one of 12·2 per cent.

(*To be continued.*)

PHOTOGRAPHY IN CHINA.

The old adage that "there is many a slip 'twixt the cup and the lip" has been unpleasantly realised in the case of Mr. R. Morrison. This gentleman was attached to Lord Elgin's embassy in China, and under circumstances of great difficulty—such as deteriorated chemicals, intense heat—the thermometer marking, in the coolest place that could be found, 96 degrees—he had obtained a number of interesting photographic negatives. Among these were included a general view of Tien-tsin, taken from the upper story of a temple; views of the river and the entrance to the grand canal; of the Joss-House, which was the residence of the English and French embassies; as well as of the building in which the treaties were signed, called "The Temple of the Winds." It will be seen that all these are subjects of great interest to the public, and it is with regret, therefore, that we announce that all these negatives, together with many others, were destroyed by an accident that befell a part of the ambassadorial baggage.

It is possible that by a little manœuvring pictures may still be obtained from some of these negatives; and, indeed, we have seen one, "The imperial commissioners, Kweiliang and Hwashana," which, though it shows signs of having been "touched," which are visible enough to the eye of a photographer, is a photograph of great merit, the faces being alive with expression, and possessing an individuality which at once stamps them as portraits.

There was one peculiar difficulty which Mr. Morrison had to encounter beyond those we have mentioned, and which was not incident on the deterioration of the chemicals, and this arose from the variableness in the quality of the light; the actinic rays, which were strong enough to give a good picture in a given time under certain circumstances, being so much strengthened or weakened in the short time necessary for preparing another plate, that he frequently found that the second picture was under or over exposed, and this notwithstanding that all the other conditions were precisely the same.

Critical Notices.

Curiosities of Science. By J. Timbs. London: Kent & Co.

We think that nobody will be inclined to disagree with us when we say, that if there is anything which is "not generally known," Mr. Timbs is the gentleman to whom we can refer, with all confidence, for an explanation of it—inasmuch as he has apparently made it a life study to acquire that knowledge of incidents and facts which are not patent to the world. The arduous task of obtaining correct information respecting common errors, is one which requires no little amount of tact and observation. It would be difficult to mention any one who is so capable of following this pursuit as the author of "Curiosities of Science." Mr. Timbs seems to be a kind of standard reference library, with catalogue included, to which we may go and gather old facts and forgotten truths. A fact is stated in a terse, laconic, and concise manner, yet, at the same time, sufficiently copious to treat the subject fairly. Some facts, related by him in a paragraph, we have seen spun out by others to a small book; yet, amid all the redundancy of language used, it has failed to give as clear a definition of what was attempted to be explained as we have here in a few lines. This work is one which the scientific reader will hail with delight, for here he will find many important facts which he may have forgotten; and certainly not one of the least important branches of knowledge is the retention of what we have read, if we are not possessed of good memories, or, at least, a common-place book which shall assist in recalling forgotten facts. This book cannot fail to be of the greatest value to a scientific reader; but valuable as it may be to that class of readers, it will be equally, if not more so, to those ignorant of more than the first principles of science; since the information here selected is not merely abstruse reasoning or dry facts, but is frequently interspersed with many interesting and instructive anecdotes. Of course the part of the work which most nearly concerns us is the photographic portion, and we are sorry that, in this department, there is such comparative paucity; for it must be apparent, that within the last few years a number of new and highly important facts have been brought to light in connection with photography which ought to have found a place in this volume. We do not write these remarks in any hypercritical spirit. We do not wish to see a history of photography inserted, because that would not be in keeping with the plan of the

author. What we wish is, that some of the more important facts connected with the heliographic art should find a place here. It will be seen by the most unobservant that, in the present state of scientific advancement, there are many important facts daily coming to light, and, thus discretion would be required to see that the selection should be one which would not only be scientifically, but also generally interesting. In the former the author has succeeded admirably, and, at the same time, he has not been unmindful in the latter. The extract on "The Art of Observation," from the *North British Review*, strikes us as being a fair exemplification of the talent of selection which Mr. Timbs displays to the fullest extent. It says:—"To observe properly, in the very simplest of the physical sciences, requires a long and severe training. No one knows this so well as the great discoverer, Faraday, who once said, that he always doubted his own observations. Mitscherlick, on one occasion, remarked to a man of science, that it took fourteen years to discover and establish a single new fact in chemistry. An enthusiastic student one day betook himself to Baron Cuvier, with the exhibition of a new organ—a muscle, which he supposed himself to have discovered in the body of some living creature or other; but the experienced and sagacious naturalist kindly bade the young man return to him with the same discovery in six months. The Baron would not even listen to the student's demonstration, nor examine his dissection, till the eager and youthful discoverer had hung over the object of inquiry for half a year, and yet that object was a mere thing of the senses." Would that some of our enthusiastic new process discoverers had been brought up in this school!

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued.*)

Landscape Backgrounds.—The natural background of the photograph should be of a similar gray to that described in our last lesson. If it be too dark, it is difficult to cover evenly and smoothly with blue so as to secure a clear, bright sky; and if it be too light, the landscape will be flat and tame. To explain the last remark, we may here state, that all the shadows in the landscape are obtained by leaving untouched the dark gray of the background, the lights and half lights being painted on.

Some knowledge of drawing is absolutely necessary for success here; for although any elaborate attempt at design or composition would be out of place, yet, as distance and foreground must be indicated by some kind of form, and as clouds, even, must have some shape, a little skill in drawing, however slight, is necessary as a preliminary acquisition. Unless a large extent of background is to be covered, very little need be attempted beyond a sky; but let it be remembered that the proximity of blue is rarely favourable to any complexion but a very fair one. If a landscape background be desired where the sitter has a sallow complexion, the general tone of the sky may be kept somewhat gray and cloudy, a little bright blue only breaking in at the zenith.

It is impossible to give any very detailed directions as to the effects to be produced, so much depends on the picture to be coloured, and on the taste of the artist. We can only give here, as we have done before, one illustration which will serve as a general indication of the method to be pursued. We will suppose a landscape with evening sky and glowing sunset is to be attempted. Commence at the horizon, making it about one-third from the bottom of the plate. The tint labelled "horizon" must be used to trace the distant outline of the landscape, which should be of an irregular, undulating character; a few streaks of this tint intermingled with carmine, or carmine and flesh colour, form the lower part of the sky. A good effect is often produced by thus repeating the flesh tint in the background; but remember that the tint in the background should never be so pure or brilliant as that in the face. These colours may merge into various tints of blue, lavender, or gray, and these again into a bright, clear sky-blue. The sky may be broken with clouds, according to the fancy of the colorist, whose taste must also decide their colour, size, and shape. It must be remembered, however, that, whatever be their colour, they must be something more than flat patches; they must possess light and shadow to give them relief and form. Some colorists leave spaces untouched by the blue, in which the clouds are subsequently coloured. We find it a simpler plan, and one presenting no difficulties of manipulation, to colour them upon the blue without leaving such spaces. The lighted edge may be well defined with "silver gray;" this edge should not be smooth or soft, but generally somewhat ragged or abrupt, and should sometimes have an irregular, fleecy effect. For the shadowed portion use dark gray, or dark gray and lavender, into which the blue of the sky may gradually merge, which will give a partially transparent vapoury effect; unless some care be taken to produce this effect, the clouds may easily be made to look like so many irregular-shaped pieces of rock jutting out from the sky. The clouds near the horizon, in the sky we are describing, should be of a warmer tint, using flesh tints, or those mixed with yellow for the lights, and warm gray and purple for the shadows.

The extreme distance of the landscape where it joins the horizon, may be coloured with a bluish gray, or with the bluish green tint labelled "distance," warmer greens, browns, and yellows being used as the landscape advances towards the foreground, to which, of course, more marked definition of form will be given. Very sharp or detailed drawing, however, is not required in any portion of a background, as even the most advancing points are supposed to be some distance behind the figure, and general effects rather than definite forms are required, the idea of distance and atmosphere as much as possible pervading the whole. If a large space of background is to be covered, some variety of form and colour should be attempted. Water may be coloured with dark blue, the light on its surface with white or silver gray.

The colorist ambitious of producing architectural effects, as columns, balustrades, &c., may easily do so, if he possess sufficient skill in drawing, by using light grays or browns, or these with a little yellow, for the lights and half lights, leaving the plate untouched for the deep shadows. Let him be careful, however, to preserve some keeping in his effects, and see that, in colouring a column, for instance, his base, shaft, and capital belong to each other. Drapery may be managed in the same way, taking care that the drawing of the folds resembles as nearly as possible that of the fabric to be imitated. As we have before stated, however, as a general rule, a more simple and chaste effect is obtained by avoiding the crowding into the background of objects having no connection with the subject.

(*To be continued.*)

Photographic Chemistry.

ORGANIC CHEMISTRY—(*continued*).

AMONG organic bodies is one which is of very great interest to photographers, and is likely to retain its importance in their estimation, in spite of all the various substances that are proposed as substitutes for it; this substance is *albumen*. At ordinary temperatures it is soluble in water, but if the temperature be increased to about 150° it becomes a solid; and this change may likewise be produced without the aid of heat by the action of alcohol, creosote, and the greater part of the acids and the metallic salts. This property has induced some photographers to employ it in the preparation of plates for photographic purposes, &c., to which we shall refer more in detail in a future number.

CHEMICAL MANIPULATIONS.

The principal chemical manipulations in photography are comprised in *dissolving*, *filtering*, and *crystallising*. In all these operations it is advisable, as far as possible, to employ utensils made of glass or porcelain; the greater number of substances used in the laboratory containing free acids, or metals in solution, which would either attack metal vessels, or be themselves contaminated. Gutta percha vessels are available for many of these operations, but they have the drawbacks of being altered in shape by heat, of being acted upon, and even dissolved, by essences, and moreover, from being badly prepared, or subjected to a too prolonged desiccation, they become brittle, or otherwise unfit for use. The number of utensils that are absolutely indispensable to the carrying out of these manipulations is not large; a few funnels of different sizes, some flat-bottomed glasses for precipitating, some stoppered bottles for holding solutions, some dishes or basins, and some small porcelain capsules.

Of Solutions.—That which is generally understood by the expression *to dissolve a body* is, the causing it to disappear in a liquid which does not alter its chemical composition. For example, sugar is a solid which dissolves in water, and communicates to the water a sweet taste; but though the sugar has become invisible it is present, unaltered, in the liquid, as may readily be proved by evaporating this liquid, when the sugar will be found left in the form of crystals. Water also dissolves nitric acid, which is a liquid, and hydrochloric acid, which is of a gaseous nature, to form homogeneous liquids, which have the properties of the bodies it holds in solution.

When a liquid has dissolved as great a portion of any substance as it is capable of dissolving, it is said to be *saturated*, that is to say, that if the saturating substance were suffered to remain in the water for any length of time, no more of it would be dissolved. Generally, a liquid possesses a greater capacity for dissolving substances when heated than when cold; it also saturates itself with greater rapidity.

Filtration.—When a body is partially dissolved, it is often advisable to filter the solution to separate substances in suspension; it is thus rendered perfectly clear, the undissolved particles being held back by the paper of which the filter is composed, this paper being what is usually termed blotting paper, that is, paper which has been made without size. This paper is of different colours, and may, any of it, be employed in filtering; but we advise the use of the white only, that being made of cleaner materials than the coloured papers.

The mode of making these filters is easy enough. Take a square or round piece of blotting paper, fold it in half, and then in half again, the lines of the fold passing through the centre of the paper. Upon now opening the folded paper so that three thicknesses come on the one side, and one on the other, a cone-shaped filter will be obtained. This is then placed in the funnel, the sides pressed closely together, and the liquid poured in. There are other methods of making filters, but the above will generally be found effectual; but in cases where the paper would be attacked by the liquid undergoing the process of filtration, as, for instance, in filtering nitric acid, in this case it is necessary to substitute a bit of tow, or a pellet of asbestos, which is pushed lightly into the neck of the funnel.

(To be continued.)

Dictionary of Photography.

AMBER.—A fossil substance, which has many of the characters of a resin. It is a light yellow transparent substance, of a slightly greater density than water. It has the property of becoming very electrical by friction. Amber consists of a mixture of several resinous bodies. It has been used in photography for the purpose of preparing a varnish for negatives; but it is not of much value owing to its liability to scratch. The mode of preparing amber varnish has been fully described in the "PHOTOGRAPHIC NEWS," vol. i. p. 144.

AMBROTYPE.—A name given in America to positives on glass, or other transparent medium, in which the whites are composed of the metallic deposit, and the dark parts are obtained by placing black varnish, or other substance, behind the picture.

AMMONIA.—An alkali, which is gaseous in its uncombined state, and is combined of 3 equivalents of hydrogen and 1 of nitrogen. It is often called *volatile alkali*. It possesses great pungency and powerful alkaline properties. Water readily absorbs about 500 times its volume, and in this state forms strong liquid ammonia, which, when much more diluted, is popularly known as spirits of hartshorn. As usually met with, in the form of a crystalline whitish mass, commonly called smelling salts, it is combined with carbonic acid and water, forming a sesqui-carbonate of ammonia. It is easily recognised by its pungent odour, changing vegetable blues into green, and by producing dense white fumes when brought in contact with the vapour of hydrochloric acid. Ammonia enters largely into the photographic processes. In the daguerreotype process it is exceedingly useful—in a diluted state (say 1 part liquid ammonia to 18 of water) for cleaning the plate. Ammonia, in combination with various salts of iron, silver, &c., has been employed for paper and glass photographs. Ammonia readily dissolves chloride of silver; it has, therefore, been proposed by Le Gray for fixing positive proofs. He states that very agreeable red tints may be thus obtained, and these may be brought back to the black colour by gallic acid, and then fixed definitely by washing the proof in several waters.

AMMONIO-CITRATE OF IRON.—A combination of citric acid and ammonia with iron, &c. It is obtained by dissolving pure iron filings in citrate of ammonia. When the filings are reduced to one-half, add a little water; filter and evaporate to dryness. Papers washed with this compound, and developed with various re-agents, are of great sensibility, and give pictures of great depth and sharpness, but they often spontaneously darken, and become eventually obliterated.

AMMONIO-NITRATE OF IRON.—Iron in combination with ammonia and nitric acid—little used in the art, and of little importance.

AMMONIO-NITRATE OF SILVER.—A compound, consisting of ammonia, silver, and nitric acid; employed as a sensitive wash for paper. The solution is made by dissolving 1 part of nitrate of silver in 12 of distilled water, and gradually adding strong liquid ammonia, until the precipitate first produced is again nearly dissolved. This solution is applied to salted paper—previously stretched on a board a little larger than itself—with a brush, evenly, smoothly, and thoroughly. When the paper is completely wetted, let it dry. Then place the negative paper to be copied, with its back uppermost, upon the sensitive side of the prepared paper, and press it close by means of a plate of glass, and expose it to the sun. The exposed parts of the paper soon change to a slaty-blue, deepening towards black. When the picture is fully developed, it should be washed in rain-water, dried off with bibulous paper, and immersed in a solution of hyposulphite of soda—1 ounce of the salt to a quart of water. Let it soak for some time and occasionally agitate it; take it out again; wash with warm water; and thoroughly dry with bibulous paper and exposure to the air. Some photographers consider this the best and most economical photographic paper.

AMMONIO-TARTRATE OF IRON—Is composed of 1 part tartaric acid, 3 parts iron filings, digested for two or three days in a sufficient quantity of hot water to barely cover the mixture, frequently stirring it, and with an addition of liquor ammoniæ; dilute with water; decant; wash the undissolved portion of iron; filter the mixed liquors; and evaporate to dryness. This substance is used in a similar way to the ammonio-citrate of iron.

(To be continued.)

A Catechism of Photography.

APPLICATION OF THE COLLODION.

Q. How is the plate to be held while the collodion is applied?

A. When the glass is perfectly clean, the collodion must be applied so as to insure a perfectly even film over the whole of the surface. This operation demands some practice. If the plate be not too large, it may be supported on the ends of the thumb and fingers of the left hand. There is also an instrument called the pneumatic plate-holder, used by some photographers. A piece of india-rubber is sometimes attached to the back of the plate as a sort of handle; but the best and safest mode, when practicable, is to hold it by one corner by the thumb and fingers.

Q. How is the collodion to be applied?

A. While the glass plate is held in a perfectly horizontal position in the left hand, the collodion is to be poured into the centre with the right. As soon as the collodion has settled clearly and evenly over the whole surface, the plate may be tilted so as to allow the excess of collodion to flow back into the bottle from one corner; after which, the plate must be again held vertically, and oscillated from left to right, and from right to left, in order to obtain a perfectly even coating.

Q. Does not the ether in the collodion evaporate when exposed to the air?

A. It does, and this fact induces many operators to perform the coating process in great haste; but it is much better to do it steadily, and submit to loss by evaporation, than to fail in obtaining an even film. A little good ether can at any time be added to the collodion.

EXCITING THE PLATE.

Q. What must be done in order to render the collodion surface sensitive to light?

A. It must be plunged into a solution of nitrate of silver. The liquid penetrates the collodion film, and the nitrate of silver is thus brought into immediate contact with the soluble iodide of cadmium, ammonium, &c., rendering the surface sensitive to the action of light.

Q. Of what is the exciting bath composed?

A. Of nitrate of silver and distilled water, in the following proportions:—

Nitrate of silver	10 drachms.
Distilled water	20 ounces.

Q. Is this the bath invariably employed?

A. No; there are some variations. For instance—iodide of silver, in the proportion of 7 grains, is occasionally added.

Q. What is the object of adding the iodide of silver?

A. The object of putting the iodide of silver is that the nitrate may be saturated with it, as the plates would otherwise be deprived of a certain portion.

Q. Is not alcohol or ether occasionally added?

A. Yes; but most photographers regard such additions as altogether useless, and therefore carefully avoid them. Everything connected with photography should be done as simply as possible; and any additions to solutions—which additions may be dispensed with—ought not on any account to be introduced.

Q. What quantity of solution should be made at once?

A. This must, of course, depend on circumstances, but it rests chiefly on the form of the trough or bath which is employed, and also upon the size of the plate.

Q. What is the chief difference between the baths?

A. Some of them are vertical, and others horizontal. With the former a glass dipper is provided, upon which the plate rests, and which prevents the necessity of any handle, or of the fingers going into the liquid. With the horizontal bath a piece of india-rubber is usually attached to the back of the plate as a handle whilst applying the collodion, and to keep the fingers from the solution while dipping in the bath; but in either case there must be a sufficient quantity of the sensitive mixture in the bath to allow of the plate's immersion.

Q. For how long a time must the plate be immersed?

A. It must be immersed for a sufficient time to allow a free action of the sensitive solution on the surface. The temperature and composition of the collodion affect this very considerably; but, as a general rule, the plate must be submitted to the sensitive solution for from two to four minutes.

Q. Should the plate be allowed to remain quietly in the bath?

A. No; it should be lifted out of the liquid two or three times.

Q. Why?

A. By so doing the action is hastened, and a more even coating obtained.

Q. When the plate is rendered sufficiently sensitive, what is to be done?

A. The plate must be removed carefully from the solution, and as much as possible of the liquor be allowed to drain off.

Q. May it be allowed to dry?

A. No; the condition to be obtained is that of dampness without superfluous moisture.

Q. Thus prepared, is it exceedingly sensitive to the action of light?

A. It is, and every precaution is necessary to prevent any ray of daylight falling upon it. The sensitive solution must consequently be applied in a room chemically dark; this renders it difficult to take good collodion views in the open air—the use of a dark room being indispensable.

EXPOSURE IN THE CAMERA.

Q. How long must the plate be exposed in the camera?

A. The exposure of the plate in the camera must be determined by incidental circumstances. Much must depend on the intensity of the light; much on the nature of the subject to be taken. Practice can alone furnish a satisfactory reply to this difficult question; experience in this respect is the only safe teacher.

Q. How may we judge whether the plate has been exposed for too long or too short a time in the camera?

A. This is obvious on inspection. For instance—if on applying the developing mixture the shadows of the picture are brought out as rapidly as other parts, it is clear the plate has been too long in the camera; if, on the contrary, the picture is very slow in developing, and the shadows are scarcely brought out at all, it is evident the plate has not been long enough in the camera.

Q. What are the appearances in developing which indicate a good picture?

A. First, the appearance of all the brightest lights, and gradually the various shades, until at length the deepest shadows are brought out with all the strength and force of a sepia drawing.

(*To be continued.*)

Correspondence.

PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

Besides the objects mentioned in my last communication, there are at Bruges very numerous and beautiful, as well as curious specimens of architecture, which are well suited for pictures of a good size; while, if permission can be obtained to photograph them, there are various objects of interest in the churches and cathedral, which are admirably suited for stereoscopic pictures. In the cathedral, for instance, there are, among other things, a series of ornamental brasses, which are built into the wall, and are interesting specimens of Flemish art in the fifteenth and sixteenth centuries. The church of St. Jacques likewise

contains some monumental brasses. In the church of Notre Dame there is an elaborately carved wood pulpit, which is very well placed for the photographer: and in one of the chapels there is a statue of the Virgin and child, which is attributed to Michel Angelo, respecting which the tradition runneth in Bruges, that it was being taken to England when the vessel containing it was wrecked on the coast of Flanders; and it is likewise said that Horace Walpole offered 30,000 florins for it. In common with a good many other valuable objects, during the continental war, it made a journey to Paris. In another of the chapels there are the tombs of Charles the Bold and his daughter Mary, the wife of the Emperor Maximilian. They are of great beauty; and on the top of them, on a slab of marble, are effigies in richly gilt copper of those who repose within. There will be some difficulty in getting pictures of these, as planks are placed along the railing to prevent anybody from looking into the chapel, a charge of half a franc is made for showing the contents; and I doubt whether the distance between the monuments and the wall of the chapel would be sufficient to allow the camera to be planted.

Views in the country of Belgium, whether of objects or landscapes, that are worth taking are so few and far between that it is seldom worth while to visit any other than the principal towns, which are connected by railway with each other; therefore, when I had exhausted Bruges, I packed up my apparatus and placed myself in the train and proceeded to Ghent. This city is far from being either as populous or as rich as at the period when Quentin Durward served Louis XI. of France, yet it is still a place of considerable trade, and manufactures a large quantity of cotton and other goods. The number of workmen employed in these manufactures is very considerable; and a custom is still in existence of ringing a bell three times a day, morning, [illegible] and evening, to summon the men to their work an[illegible] This was established about the year 1400, and people were cautioned to remain in-doors while it tolled, as well as to keep their children there, to prevent them from being trodden to death by the immense stream of workmen; vessels in the canals were brought to a stop at the drawbridges, which could not be raised so long as the sound of the bell could be heard. This city alone contains objects which would occupy the most industrious photographer many days to reproduce. I remained here three weeks, and, though far from being idle, I did not get all the pictures I wanted. The first which I took was of the four sides of the Vrijdags Market, a huge square, surrounded by ancient houses. It takes its name from the market being held in it every Friday. A good deal of [illegible] attaches to this square; here the [illegible] installed with a pomp, which, if we may [illegible] chronicles, far exceeded anything [illegible] the various guilds met to [illegible] and occasionally to settle [illegible] between two guilds by force of arms; as at the time when [illegible] (the brewer, as he was called, from [illegible] himself in that corporation, though himself [illegible]) took his stand here at the head of his faction, and fought a bloody battle with the fullers and those who supported them, so that the blood ran down the kennels like water after a heavy storm, and near fifteen hundred dead bodies were left lying on the ground. Worse scenes than these, however, were enacted here under the orders of the brutal Duke of Alva (whom it would require the peculiar talent of a good many Carlyles to whitewash and convert into a hero, though considering what Mr. Carlyle has recently done for the half-mad and wholly brutal Frederi[illegible] it is not impossible that it might be accomplished), [illegible] during the religious persecutions he carried on in the [illegible]lands, caused fires to be lighted here, and many [illegible]ds of Protestants to be cast into them; so that the [illegible] who inhabited the houses were, at times, almost [illegible] by their agonising screams.

[illegible] street, the name of which I forget, but it is quite [illegible] this market, I took a picture of an enormous cannon, which is said to have been used by the men of Ghent, at the siege of Oudenarde, in 1382; it is made of wrought iron and hooped, and is about 18 feet long and 10½ in circumference.

Early one morning, I went to the Marché aux Poissons, and on my way home I passed along the Place St. Pharaïde, for the purpose of seeing if I could get a photograph of what is reckoned, I believe, the oldest building in Belgium, and which was once the residence of Edward III. and his family, and where his wife was delivered of a son, afterwards known as John of Ghent. I found very little of it left, but the next morning I got an interesting picture of the turreted gateway, interesting not on account of its architectural beauty, but from the historical reminiscences associated with it.

VIATOR.

WINTER DEVELOPERS.—PHOTOGRAPHIC QUACKERY.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—Most photographers know that in cold winter weather, developing solutions should be warmed, [illegible]t the use of [illegible] washing off is also adva[illegible] For out-door [illegible] tube and spirit lamp [illegible] taken with [illegible] apparatus, and the [illegible], being placed [illegible], can in a few seco[illegible] be sufficiently [illegible] latter. This, of course, applies to the work[illegible] in the field; but when dry plates are [illegible] should also be developed with warm [illegible] Mr. Hardwich recommends the employment of the [illegible] in cold weather, in preference to the usual [illegible] solution, adding to it a small quantity of acetate of [illegible], which has the effect of intensifying the negative. So popular is Mr. Hardwich's formula, that with the majority of photographers it seems to have almost superseded the old pyrogallic developer. It has been most extensively used as a summer as [illegible] as a winter solution, and having employed it successfu[illegible]elf during the past summer and autumn, I can testify [illegible] efficiency. But, sir, this is an age of progress, and [illegible] week my attention was drawn to an advertisement in o[illegible] your contemporaries, headed with the words, "Import[illegible] [illegible]." The announcement proceeded thus: "Every [illegible]grapher should possess Mr. [illegible]'s winter developers [illegible] negatives and positives. Warranted to give results [illegible] to the best productions of the summer season. The [illegible], with directions for use, forwarded on the receipt of eighteen stamps. Address, &c. &[illegible]"

Now, although I generally [illegible] advertisements of this sort, I felt a little curious to [illegible] what this "Important Discovery" was, the more so [illegible] preparing to start on a winter's tour with my camera, [illegible] have not yet found any of the dry processes to yield results equal to those of wet collodion. I therefore forwarded the eighteen stamps, and in reply received the following:—

[illegible]EGETVE DEVELEP.

Rain or dist w[illegible]	..	..	..	..	[illegible] ounces.
Carbonate Soder	..	..	..	..	[illegible] grains.
Glacel acetic acid	..	..	..	..	[illegible] drachm.
Pylogalic acid	..	..	..	..	[illegible]ains.
Formic acid	..	..	..	..	[illegible]ps.

The plate to be rediped in the nitret silver bath be[illegible]veloped. The developen sollutn to be used warm.

POSITIVE DEVELEPR.

Rain or dst watr	..	..	..	..	4 o[illegible]
Carbonte of soder	..	..	..	..	3 gr[illegible]
Nitrict acid	..	..	..	..	3 dr[illegible]
Glacel acetic acid	..	..	..	..	2 dr[illegible]
Formic acid	..	..	..	..	6 dr[illegible]

Mix the above, then add protosulphate of iron, 1½ drach[illegible] [illegible]tret of pottass in crystals, ¼ drachm, to be used warm."

For some minutes I was at a loss to perceive in [illegible] the "Important Discovery" consisted, the formulæ co[illegible]ning nothing that has not been known for years, b[illegible] in fact the common solutions, with the addition of c[illegible]ate of soda and formic acid, both of very questio[illegible] utility.

On reperusal, however, it struck me that the discovery might be in the *nitric* or *acetic*, or possibly in the *glacial*, *pyrogallic*, and *nitric* acids. Not feeling quite sure on this point, I determined on sending the formulæ to you, for the benefit (in more senses than one) of your readers.

AN AMATEUR.

NOTTINGHAM PHOTOGRAPHIC SOCIETY.

DEAR SIR,—Perhaps your readers would be interested by a short description of the First Annual Meeting and Exhibition of the Nottingham Photographic Society, which was held in the Exchange Hall, a fine spacious place, 40 feet wide and 85 feet long; and in two adjoining rooms of about 40 feet square, which were devoted mostly to cameras of various makers. Those attracting the most attention were, a lens of short focus, nine inches in diameter (which, I believe, was made in France), also a solar camera, for life-size portraits, which I think is a slight [illegible] on the original American patented instrument.

The exhibition of apparatus was [illegible]

The collection of landscapes, [illegible] and statuary [illegible] very large, including stereo[illegible] (there were [illegible] than 2,000 in number, colle[illegible] best photographers and amateurs, in this [illegible] nearly every quarter of the globe). There were [illegible] sent in for competition, of which three [illegible] offered by the Society. The first prize was [illegible] the Rev. J. J. Dredge, for a 10 × 12 in[illegible] (Southwell Cathedral), taken in [illegible] process. The second prize was awarded [illegible], for a landscape—an old castle, water, and [illegible] by far the best of its class. The stereoscopic [illegible] unusually good, and possess merits of a very high order. The one that took the prize was a landscape, consisting of a labourer's cottage, at Wilford, with thatched roof, having a whitewashed gable as the prominent feature, by Mr. Woodward, chemist, of Nottingham. H. Walter, Esq., Papplewick-hall, and C. Paget, Esq., M.P., were amongst the largest contributors, and deserved much praise for their well-chosen and valuable collection. Amongst [illegible] contributions were some fine specimens by Mr. [illegible]; E. St[illegible], Government Department of Art and Science; Mr. Becker, Derby; Joseph Sidebotham, Manchester, who presented some [illegible] specimens to the Society; S. Redgate, oil-colour [illegible]; also a large collection in possession of the Nottingham Photographic Society. I must not forget to notice the few permanent views [illegible], printed in carbon, by Mr. Shepperley, druggist, Nottingham, which deserve much praise. Mr. Thompson, [illegible], exhibited a small and valuable assortment of goods belonging to his profession. The attendance was about [illegible], of the first families in the town and country, who all appeared highly gratified with the good taste in the arrangement of the various classes and styles of the photographs.

A few short speeches would have been very appropriate; but, as there were none, I can only say that the tea and coffee were ready at nine, and the assembly gradually disappeared about ten o'clock. The rooms remained open until the 15th, at 6d. admission, for the public.—Believe me, yours truly,

A. G. GRANT.

[illegible]-hall, Jan. 6, 1859.

THE COLLODIO-ALBUMEN PROCESS.

DEAR SIR,—To the questions you have sent me on the collodio-albumen process, I send the following reply:—

1st. Whether all the operations should be performed in a dark room, or the first part of the process carried on in the light? For some time I was accustomed to work in a light room, as far as albumenising the plate, but by some careful experiments of myself and others, it was found that preparation in the light produced a slight mist over the surface of the plate, and if a very strong light were used, this fogging would become very dense; consequently, I now go through all the manipulations in a darkened room. After the albumen has been poured on the plate, it is rendered quite insensible to light.

2nd. How long the plates will keep sensitive? I have kept some plates sensitive five months without any change, but the usual time I should advise them to be kept is, a month in winter and a fortnight in summer: after this they cannot be depended on; some may be good, and others turn yellow during development. The question, *why* some plates will keep undeteriorated so much longer than others, has yet to be solved.

3rd. What is the cause of pin-holes in the skies, &c.? I have not met with this fault for some time; when I did meet with it, I considered it to arise from small undissolved crystals of iodide of potassium in the albumen; I since that time have always used a small quantity of free iodine in the albumen, as given in my former letter, and this, I suppose, has prevented its recurrence.

4th. As to the blistering of the plates; this may be entirely prevented by the following precautions:—Have the plates quite dry before pouring on the collodion; let it set *very well* before immersion in the bath, and dry the plates before the fire after pouring on the albumen. The plates may all be prepared, and allowed to dry partially in the operating room, and then placed on ledges on a large board, and exposed before a hot fire till quite dry and hard.

Trusting the above answers may be sufficient for your correspondents' guidance, I am, sir, yours truly,

January 10th, 1859. JOSEPH SIDEBOTHAM.

Photographic Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at the Literary and Philosophical Societies Rooms, on Wednesday, the 5th of January instant. Mr. Sidebotham presided. A new member was elected.

Mr. OXLEY exhibited a gasometer to contain oxygen for the lantern.

The PRESIDENT called the attention of the meeting to a number of carbon prints by Mr Pouncey's method, taken by Mr. Mudd, and which were handed round to the members for inspection. The President said he considered the specimens shown quite equal to any Mr. Pouncey had produced, he thought Mr. Pouncey's [illegible] and if Mr. Pouncey could not produce [illegible] the process was very unsatisfactory.

Mr. WARDLEY said [illegible] details of the sun prints [illegible] obtained [illegible] Mr. Pouncey's plan, and he [illegible] for the [illegible] required.

Mr. M[illegible] said he had tried Mr. P[illegible] plan for some time past, but had now resolved [illegible] several other members concurred.

A long conversation took place as to toning with *sel d'or* and alkaline baths; also as to Mr. Maxwell Lyte's plan of sulphate of soda.

The PRESIDENT called the attention to the subject of developing by daylight after dissolving the iodide of silver, and remarked that it was a curious fact that it was only a collodio-albumen plate which could be developed after fixing, and that several members who had tried, had been unable to develop plain collodion, also that after fixing with cyanide, it seemed impossible to develop.

Mr. YOUNG stated that he had been able to develop after fixing with cyanide, but thought it required much longer time. He exhibited a picture so produced. A long discussion [illegible] lowed as to the theory, and the President said, [illegible] examined the film of an exposed plate after the fixing [illegible] a powerful microscope, but could not see any trace [illegible] picture.

The PRESIDENT remarked that Mr. Wild, a me[illegible] was absent that night, had been trying a new [illegible]

the "treacle posset process," and had obtained some very good results. The plan was to obtain serum of milk by breaking the milk with treacle and acetic acid. The idea had occurred to him from a suspicion that Mr. Norris's plates were prepared with serum of milk. The President remarked that it had occurred to him, the council might get up a stereoscopic magazine from photographs taken by the society for distribution among the members, and the idea seemed to be approved of by the meeting.

A further discussion on the subject of printing took place.

Mr. MARLEY said, he, the other day, looked at some prints taken by him some time since by gelatine and chloride of silver, and developed, and they seemed as good as ever.

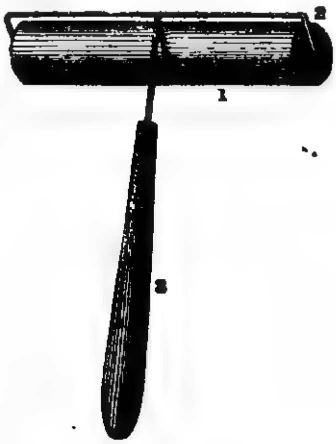
After discussing the method of washing prints, it was considered that a short washing of an hour or two was better than a long one.

A vote of thanks was passed to the President, and the proceedings closed.

Photographic Notes and Queries.

IMPROVEMENTS IN WASHING POSITIVES.

SIR,—The accompanying sketch is that of an instrument that I use to facilitate the washing of prints. I have used it some time, and find it a most convenient thing; a print, I believe, may be effectually freed from the destructive effects of hypo. in about a sixth of the time usually occupied for this purpose, without any fear of the most delicate half-tints being injured, as is frequently the case, by long immersion in water, and no doubt many, to their annoyance have found (as I have), from the same cause the tone of the picture quite altered after five or six hours' soaking in running water. Some have recommended dabbing with a sponge or with cotton wool; a process that invariably works up the pile of the paper, and the unequal pressure of such a mode cannot be depended on.



1. Wooden roller, covered with flannel.
2. Strong iron wire bent to come over the ends of roller, with eyes punched to admit of being screwed into the ends.
3. Wooden handle.

I first screw on, by means of a piece of gutta percha pipe, a fish-tail gas burner, the end of the pipe is fixed into the nose of my water tap over the sink; the water, turned on with good force, is the supply for the operation, under which I turn a large square dish upside down and let the water fall upon it, I then place my prints—one or more, according to the size—the back part up, and roll the instrument over them as the water continues to play; during this operation they get a [illegible] change of water every time the roller passes backwards and [illegible]wards, care must be taken that the water flows quite over the [illegible] every time; a smart pressure with both hands squeezes [illegible] great bulk of the water out every time, and I reckon the print to have had ten or more changes of water every minute during the operation, which could not be effected by any other process. I then place my prints in a square photographic dish, and let the water run through them for about an hour, and consider them to be as effectually washed as if they had been left in running water for six or eight hours, without suffering any damage whatever. When many prints are put together, there has been difficulty in getting the water to flow between them and in keeping them separated; the following is a simple and effectual method:—I have a jeweller's blow-pipe; over the big end I fit a piece of india rubber tubing and stretch this over the nose of the water tap, having it long enough for the bend of the pipe to lie in the bottom of the dish, and then place the dish so that the water rushes up the straight side of it: thus a circular motion is kept up by the under current, and, however many prints may be in the dish, they are continually separated, the angles of the paper are forced against the side, which causes a complete separation, and they each get the same change of water as they flow round.

32, *Sloane Street*. THOMAS WARWICK.

REMOVAL OF SILVER STAINS.

SIR,—I have found the following to be by far the most effectual mode of cleansing the fingers and nails from the stains of nitrate of silver:—First, rub with a moderately strong solution of iodine in alcohol, either with a piece of sponge or a brush; then rinse in water, and afterwards dip in or rub with a weak solution of ammonia.

For linen use the iodine solution, and then dip in weak solution of cyanide of potassium. If, as is sometimes the case, where the stain is partly caused by pyrogallic acid, a yellow stain should remain on the linen, it can be removed by leaving the part to soak for a few hours in a solution of binoxalate of potash (salt of sorrel). H. E. N.

TO PREVENT THE DISCOLORATION OF THE POSITIVE SILVER BATH.

SIR,—As photographers frequently complain that the nitrate of silver bath used in printing albumenised positive pictures becomes highly discoloured, allow me to suggest a simple and certain remedy. In the preparation of a new silver bath for the above purpose, before dissolving the silver add pure alcohol in the proportion of 2 ounces to 10 ounces distilled water, the silver being in proportion to 12 ounces liquid. I have had a bath in use for eighteen months past, nearly as clear as when first made. An old bath sufficiently strong with silver, but red like port wine, may be cleared by using kaolin, and afterwards adding 1 or 2 ounces of alcohol with silver dissolved in it; this will keep the bath clear for a long period. NORMA.

SELF-ACTING LEVELLING STAND.

SIR,—When making a self-acting levelling stand, as suggested by Mr. Sedgfield in your last number, in addition to the bob under the point of suspension, let there be two small weights at the extremities of the frame, and when gently set in motion the balancing power of these weights will cause it to continue for some time, thus keeping the developing solution in agitation, preventing deposits, &c. I have used one of this description for some time, and found it very convenient. R. W.

BEAUFOY'S ACETIC ACID.

SIR,—In the formulæ for Mr. McCraw's process, given at p. 50 of the "PHOTOGRAPHIC NEWS," two of the mixtures are to contain *Beaufoy's* acetic acid, but strength is not mentioned. I learn that there are *five* different strengths of that acid; perhaps Mr. McCraw will be kind enough to indicate the particular sort he used. H. SANDMAN.

NON-REVERSED GLASS POSITIVES, FOR COLOURING.

This effect may be produced by carefully drying the picture, after being fixed and washed, and pouring on to it Archer's transferring varnish (a solution of gutta percha in benzole) in the same way as you would collodion, only allowing the plate to remain horizontal for a few seconds, to allow the varnish to thicken, before pouring it back into the bottle. Dry by applying heat. When the varnish is cold, gently lower the picture into cold water, when the film will separate from the glass; transfer the film to another glass, so as to let the gutta percha side touch the glass, attach with varnish, then colour with ordinary photographic colour, as of course the colour side will now be the right side.

A. G. G.

DEAD BLACK FOR BRASS-WORK.

Can any of our correspondents favour us with a recipe for a dead black for brass-work, similar to that seen on the stage disc of diaphragms, &c., of the best microscopes?—ED.

SYNOPSIS OF PHOTOGRAPHIC PROCESSES.—WAXED PAPER.

Wax the paper.
Iron.
Place in dish of iodising solution 3 to 4 hours.
Dry.
Float in a dish of sensitising solution till of a straw colour.
Wash in two changes of distilled water.
Blot off.
Expose.
Immerse in a dish of developing solution.
Wash.
Immerse in a dish fixing solution.
Wash well.
Dry.
Hold before a fire or iron.

Iodising solution:—

Iodide of potassium	25	grains.
Iodine	½	,,
Water	1	ounce.

Sensitising solution:—

Nitrate of silver	15	grains.
Glacial acetic acid...	6	,,
Water	1	ounce.

Developing solution:—

Gallic acid	2	drachms.
Alcohol	1	ounce.
Glacial acetic acid	4	minims.

12 minims of the above to 1 ounce of water, and a little nitrate solution, 45 drachms for 100 square inches.

Fixing solution:—saturated solution of hypo.

H. S. I.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not allow ammonia ever to enter into the nitrate bath.

Do not fix paper positives before washing off the silver.

Do not expose a nitrate bath to the light when in good order.

Do not use cheap nitrate of silver for the nitrate bath.

Do not put away albumenised paper in a damp place.

Do not lift the plate too soon from the bath.

Do not wash positives with hot water until they have been well washed in cold.

Do not attempt to wash the hypo. in a hurry from a glass picture.

ANSWERS TO MINOR QUERIES.

BICHROMATE OF AMMONIA.—*J. M.* This salt may be prepared by taking a strong solution of chromic acid and dividing it into two parts, one of which is to be saturated with ammonia. Mix the two solutions together, and evaporate. As the chromic acid will most likely contain a large quantity of sulphuric acid (from its mode of preparation), the bichromate of ammonia will require to be re-crystallised several times. When pure, it forms beautiful red crystals, somewhat similar to the potassa salt. The formula is $NH_4\ O.\ 2\ Cr.\ O_3$.

CORRECTING A FOGGY BATH.—*A Suffolk Man. F. L. S. Hypo.* The following plan has recently been recommended for curing this fault when other methods have failed. Add solution of carbonate of soda, drop by drop, till a slight precipitate is formed which will not dissolve on agitation. Filter it, add a few filings of metallic cadmium, about one grain to each ounce of bath, and boil for about five minutes. Allow it to become cold, and then filter. A little metallic silver will be precipitated, owing to the reducing power of the cadmium, but not sufficient to diminish the strength of the bath to any sensible extent. Before using, a few drops of acetic acid must be added.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

A PHOTOGRAPHER AND A GENTLEMAN.—We fully concur in your opinions and shall, as far as we are able, always act in accordance with them; but we cannot give insertion to your letter.

J. W., CHERBOURG.—Your letter has been received with thanks. We shall be glad to see you.

J. D. J.—The two bodies you name could be prepared on a small scale, but the requisite materials would cost more, and be no more easy to get than the ready prepared salts. A print can be taken from a negative in the pressure frame on a plate prepared by any dry collodion process. Expose for a few seconds to daylight, and develop as usual.

ADOLPHUS.—Would the process you describe possess any advantage over the ordinary negative process of printing?

J. WALTER.—Your suggestion is very good, but you will observe that it was anticipated by a correspondent in our last number.

PLANO-CONVEX.—Send a private address and we will communicate with you.

C. R.—1. Use 1 ounce hypo, 4 ounces water, instead of cyanide of potassium, for the fixing bath; and if that does not remedy the bluish green colour of your positives, change the collodion. 2. By the formulæ given in our back numbers, under the head of Alabastrine Photographs. 3. Use a spirit varnish, applied warm.

A. G. G.—There was chlorine present, which precipitated the nitrate of silver The nitrate or magnesia process has now been superseded by others, in which the surface of the collodion plate is used *dry*, and thus not liable to contract dust.

J. H. B.—We prefer a distance of 3¼ inches from centre to centre of the lenses in the twin lens stereoscopic camera; as, when bisected and transposed, the pictures will be a convenient distance apart.

H. B. Y.—Neutralise it with a few drops of carbonate of soda; filter, and then make faintly acid with acetic acid.

A POOR LAD.—Expose it to the sun, or boil with cadmium, &c., as recommended in the present number.

H. MITCHELL.—1. The two positions should be parallel. 2. The waxed paper process will give quite sufficient minuteness for ordinary landscape photography. 3. Stop it down to a ¼ inch aperture. 4. Yes; but allow for the thickness of the glass when focussing. 5 and 6 we cannot answer.

P. S.—Received.

H. S. I.—Thanks for the enclosure. We are sorry we cannot help you with your proposed application of the microscope. We have had too limited an experience in such matters to be able to recommend.

T. T. SHEARD.—If your former letter was received, it was answered. We do not, however, remember the subject. If you will repeat the questions they shall be attended to.

A. C. S.—The fault is in the collodion. Is your bath faintly acid? If not, make it so with acetic acid. A reversing mirror would do as you wish.

H. T. T.—Ether 5, alcohol 3, is the proportion we prefer; but it is really of very little consequence what the quantity of alcohol be up to ⅗ths of the whole quantity. The amount of cotton also may vary very considerably without much influence on the result. Experiment for yourself, and use the proportion which best suits your mode of manipulation.

GELATINE PAPER.—Numerous inquiries having been made respecting this article, we think it would be advantageous to all parties if some agent for its supply were to advertise it in our columns.

T. C.—Received.

H C. Y.—You will find nothing so good as linen blinds.

CLAUDE.—Either of the three following sizes of lenses will do for taking landscape stereograms:—½ in. diameter and 3½ in. focus; 1 in. diameter and 4½ in. focus; or 1½ in. diameter and 6 in. focus. The smallest lens takes the quickest picture, but has a less field than the others.

Communications declined with thanks:—J. A. X.—Stereogram.—M. Z. Q.—Papa.—T. T. N.—H. O.—Old Hypo.—A Dabbler.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Tyro.—J. B. L.—An Old Photographer (see above).—Fix (see our Notes and Queries).—C. A.—S. M. B.—E. P.—Nero.

ERRATUM.—Page 212, line 3, *for* T H. Parnell *read* J. H. Parnell.

IN TYPE:—C. A. (Algeria).—J. D.—R. O. F. S.—A. Practical and Hard-working Amateur.—H. S. I.—G. C.—H. Bonus.—J. B. Robinson.—T. Barrett.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

⁂ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 20.—*January* 21, 1859.

ON THE CAMERA OBSCURA.

BY PROFESSOR PETZVAL, OF VIENNA.*

ON the 23rd of July, 1857, Professor Petzval presented his new object-glass to the Academy of Vienna, and at the same time made a communication on the general properties of the camera obscura, which, from its elementary nature, is well adapted to supply photographers with much accurate and valuable information. A somewhat complete abstract of this communication, therefore, cannot fail to interest a large number of readers.

A camera obscura may be defined as an instrument for obtaining, at a finite distance, an image of any number of objects; and, in accordance with this definition, numerous properties at once suggest themselves as desirable.

We may reasonably demand that the image shall be well defined or sharp; that it shall also be well illuminated, so as to exhibit proper light and shade; further, that it shall be true to nature, and also that it shall lie in a plane. If possible, too, the camera should simultaneously furnish images of both near and distant objects,—should possess a large field of view, and give at pleasure either large or small pictures. Lastly, the instrument must have a convenient form, and cost as little as possible.

Most of these desiderata exist in an arrangement wherein the optician's art is unnecessary. If a screen be placed behind a small hole in the shutter of a carefully darkened room, an inverted image of external objects is at once obtained, which possesses, in great perfection, many of the desired properties. We have here absolute faithfulness in nature, pictures at once of near and of distant objects, a field of vision as near to 180° as we please, and either a plane or a curved image. The expense of such an apparatus is small enough, and its convenience indisputable; in short, the picture obtained fails only in sharpness and illumination, but it must be admitted that these defects are so serious as to render the arrangement next to worthless for most purposes. Nevertheless, for many reasons, the arrangement in question deserves closer examination; it furnishes an excellent example of what nature presents, and of what art must supply; we learn from it also how often natural endowments are sacrificed, when by artificial means, we seek to enhance the nobler properties of sharpness and illumination; and lastly, we may here study the nature and influence of the imperfections inseparable from this, the *natural camera*.

Let us assume that the external object is so distant, that every point of the same sends to the hole in the shutter a cone of rays so acute as not to differ essentially from a cylinder. If light were propagated in straight lines, it is manifest that the rays of every such cylinder would reach the screen in full possession of their own peculiar colour and intensity of light, and they would impart both these qualities to a small portion of that screen, nearly circular in form, and of the same size as the hole. The several coloured spots thus formed would group themselves so as to constitute an inverted picture of the object, and the sharpness of this picture would be capable of being augmented indefinitely by diminishing the size of the hole.

Light, however, instead of being propagated in straight lines, is turned aside or diffracted on passing through an aperture, and thus gives rise to far different phenomena. The external object being a luminous point—a star, for instance—its image is not only always greater than the hole; but on diminishing the size of the latter, we find that, as soon as a certain limit has been reached, the image, instead of diminishing accordingly, actually becomes larger and less luminous. On closer examination, this image is found to consist of a round luminous spot, surrounded by concentric rings, alternately light and dark. The central spot is always found to possess the greatest intensity of light, the surrounding light rings being in general so faint as only to be perceptible by artificial means.

We may suppose the defect in sharpness to be measured by the diameter of the above circular spot, conceived to extend up to the commencement of the first dark ring. We learn by calculation that, on the whole, it would be useless to diminish the diameter of the aperture beyond $\frac{1}{60}$th of an inch, and that, under the most advantageous circumstances, the image of a luminous point is a circular spot $\frac{1}{24}$th of an inch in diameter. The picture we should obtain under these circumstances would clearly bear no magnifying whatever, but, on the contrary, would require to be inspected at a distance of 12 feet, at least. To obtain a more correct estimate, however, of the sharpness and illumination of the picture in the natural camera, let us compare it with that of a camera with a tolerably good object-glass of 3 inches aperture, and 11 inches focal length. In the middle of the field, the picture furnished by such a camera will bear magnifying at least ten times; and, consequently, in point of sharpness, is 180 times superior to the picture in the natural camera. With respect to illumination, it will be observed that the two cameras have the same focal length, 11 inches, and consequently furnish equal-sized images of all external objects; their apertures, however, have the ratio 1 : 180; that of the first being $\frac{1}{60}$th of an inch, whilst that of the second is 3 inches.

Now, the focal length being constant, the illumination of a picture increases in proportion to the square of the aperture, so that, with respect to this property, the camera with is 32,400 times superior to that without glass. It is necessary to observe, however, that a picture so well illuminated as the one here used as a term of comparison, could in practice be scarcely obtained.

Two things are worthy of notice in the foregoing. In the first place we see how, by artificial means, that is to say, by means of well arranged and properly curved lenses, it is possible to increase the qualities of sharpness and illumination in an instrument,—the first in the ratio of 1 : 180, and the second, indeed, in the ratio of 1 : 32,400. In the second place, we have become acquainted with a kind of aberration which puts a limit to the extreme use of diaphragms before camera lenses. To illustrate this still more, let us suppose that, in order to improve the properties of the picture, we were to try the experiment of reducing, by an interposed diaphragm, the aperture of the lens from 3 inches to $\frac{1}{2}$ an inch. It is evident from calculation that we should thereby cause the image of a luminous point to become a round spot nearly $\frac{1}{1200}$th of an inch in diameter. Now, in fine engravings, &c. we often meet with lines whose breadth is even less than $\frac{1}{500}$th of an inch; so that if our blinded lens were employed to copy such engravings, these fine lines would appear still finer in the picture, in consequence of the overlapping of the aberration circles of the adjacent luminous points. This defect would also be increased by the aberrations due to other causes, such as the

* Condensed from the *Philosophical Magazine*. For the full report, see *Sitzungsberichte der Mathem. Naturw. Classe der Kaiserlichen Academie der Wissenschaften*, Vol. xxvi., p. 83.

curvature of the image, &c., so that ultimately the fine black lines of the original would in the copy be either undistinguishable, or at most mere pale shadows; at all events, the picture, if it bore examination with the naked eye, would not admit of magnifying.

In order to advance step by step, let us now return to the natural camera, and seek to improve it by introducing into the hole in the shutter a small, simple, and, therefore, unachromatic lens of crown glass, which, for the sake of comparison, we will suppose to have a focal length of 11 inches. Let us examine what good properties are lost and gained by this certainly cheap alteration.

As long as the aperture of the lens is small in comparison with its focal length, we may safely assume that, apart from diffraction, the equally refrangible rays in any incident cylinder are made to converge to a point,—in other words, that, on placing the screen properly, the image of a point in homogenous light is itself a point. This condition of placing the screen exactly in the focus of the lens at once constitutes an inconvenience, inseparable from the new camera, which did not exist in the natural one.

There are, however, graver complications to notice. Glass does not refract all rays of the spectrum alike; each differently coloured ray has a different focus, and the screen cannot, of course, accommodate all.

By similar calculations to that used above, it will be found that the aperture which here corresponds to the sharpest image is about ¼th of an inch, or a little more than seven times the best aperture in the natural camera. Consequently the illumination of image is increased in the ratio of 1 : 50 nearly, though it still remains inferior to the ordinary camera in the ratio of 1 : 648. At the same time, however, the sharpness of the image has been considerably improved. In the natural camera, the image of a point had a mean diameter of 0·04 of an inch; it is now diminished to 0·005. The sharpness of the image is now eight times greater than before, and in this respect is only inferior to the ordinary camera in the ratio of 1 : 22½.

These not very important improvements in sharpness and illumination have been dearly enough purchased; for, although the general faithfulness to nature has not been essentially impaired, the difficulty of obtaining sharp images has been increased, on account of the chemical and optical foci being now separated by about a quarter of an inch. It is true that the difficulty here alluded to might easily be overcome if the linear chromatic aberration, and with it the distance between the foci, were always the same; for then it would suffice to place the plate destined to receive the picture a quarter of an inch in advance of the ground-glass plate. But this distance varies with the distance of the object from the lens, and this varying space between the chemical foci constituting, as it does, so serious a defect, inseparable from all cameras with unachromatic lenses, the best possible achromatism is even more indispensable for this instrument than it is for the telescope itself.

The above formula also informs us of another disadvantage of the new camera as compared with the natural one. In the latter, the fact of the objects being at different distances was of no importance; in the former, however, the images of near objects are more distant from the lens than are those of more remote objects; and since the plane of the screen cannot accommodate all, it follows that if some images are sharp, others cannot be so. This inconvenience compels the photographer to have recourse to many expedients (such as grouping of the objects, &c.), of which some will be considered in the sequel.

Again, the sharpest parts of the picture of a distant plane object no longer fall in a plane, but on a spherical surface whose radius is 16½ inches, and whose concavity is turned towards the lens. In consequence of this unavoidable circumstance, and the many difficulties attendant upon photographing on curved surfaces, sharpness must be sacrificed the more the field of view is increased.

Above all other things, however, the restoration of achromatism is the most important; for the chromatic aberration disappearing thereby, aperture and consequently illumination may be increased, whilst at the same time the aberration arising from diffraction will be proportionally diminished. As is well known, this achromatism is obtained by a combination of crown and flint-glass lenses; and the method which has long been employed in telescopes not only leads to achromatism, but also diminishes a new defect known as spherical aberration.

In Daguerre's time these telescopic object-glasses, transferred to the camera, were in general use. In all probability, too, they were at first placed in the same manner, with the convex side towards the object; but experiment must soon have shown that this disposition was not applicable. For, destined by their construction to give very sharp but very small images, spherical aberration is destroyed only near the axis of such lenses; in consequence of which, when the field of view is larger, a great deterioration of sharpness is observed on passing from the centre towards the edges of the picture. This deterioration is increased, too, by the fact, that the image, instead of being plane as required by the camera, lies on a curved surface, which approaches in form to that of a paraboloid of rotation, whose radius of curvature at the vertex is equal to ⅜ of the focal length.

In the absence of calculations founded on theory, by means of which the sharpness at the edges of the image might be increased, opticians have sought to improve the telescopic lens so as to adapt it to the camera, by diminishing its superfluous sharpness at the centre, or, rather, by rendering the contrast between the centre and the edges less striking. To obtain a notion of how this may be accomplished, let the object-lens of a good telescope be unscrewed, and turned so as to present its plane side to the object. By so doing, the good telescope will be converted into a very poor instrument; and in order to obtain even a tolerable image, extreme blinding of the lens must be resorted to.

(To be continued.)

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.*

In the present collection, the show of landscape photographs is not large, but it is diversified; and, as was to be expected. Bedford, Fenton, and Morgan are among the foremost. Fenton we have always regarded as the leading English landscape and architectural photographer; now, however, Bedford seems likely to take the lead. In the productions of the former we see scarcely any progress, on the contrary, rather retrogression, while in the latter gentleman's pictures, as we recently remarked, there is great and decided improvement. In Fenton's series there are some perhaps finer than he has ever executed before, but, at the same time, we regret to state that the majority of his landscapes are far below the average merit of his pieces. Among his best are "Tintern Abbey" (46); it is clearer in tone than the generality of his pictures, and as Bedford has happened to execute a view of almost the same place, comparison is forced upon us, and we are compelled to admit the superiority of Bedford's treatment of the subject. "Raglan Castle" (54) is a fine specimen of Fenton's style, but it wants vigour. "The Central Valley, Cheddar Cliffs" (55), is, perhaps, one of his finest. In it there are nice light and shade, and clear foreground. The photograph "On the Wye, the Windcliffe" (62), has combined in it many of the defects perceptible in the whole series. The foreground is so dark that it looks almost as if a curtain were drawn across the picture, while the background is beautifully distinct and clear; the transition from the foreground to the background is so abrupt as at once to strike and offend the eye. Many of Bedford's views are similar in character to those already noticed in the collection of the Architectural Association. In

* Continued from p. 218.

looking at them we are almost inclined to think that they are even finer than those which we have previously referred to. We feel that we cannot speak too highly of this artist's work; everything he does, he does well. It is a difficult matter, out of the large number of subjects he has sent for exhibition, to take one picture and say that it is positively the best of the series; the work is done in such an equal manner that it is impossible to select this or that as the finest. The new views which he has executed for her Majesty, we scarcely like so well as the first series. We do not now refer to the photographic manipulation, but to the views themselves; for this, however, Mr. Bedford is not responsible, inasmuch as the selection is not his, but that of her Majesty. Next in order comes Morgan, who is the nearest competitor that Bedford has. Yet how distinctive are the characteristics of the treatment in each case! Both are successful in the selection of artistic sites, in the beautiful delicacy of intricate detail. Still, each has an individuality so striking, that the most careless observer would at once detect the difference. Morgan's views are numerous. In many points they are much like some that he has previously exhibited, but, generally speaking, they are more carefully executed. In his river scenery he is most successful, and every one of his pictures must be interesting to the artist. "On the Froom, Evening," is a beautiful study. The shadows of the trees, and the reflection of the foliage in the river, are really charming.

There are several views here by T. Davies, chiefly woodland scenery. They have many good points about them, but the artist's style of treatment, and really excellent mode of printing, are hardly adapted to his selections; if he attempted architectural views he would be attended with great success. Rosling's small views are, generally speaking, good, though they would lose nothing by having, in some instances, a little more half-tone. The artistic taste displayed in the "Farm Yard" (5) is far below that which is shown in the "Four Views in France" (91). The "Trees" and "Sweet Chestnuts" are admirably given. As a specimen of architectural photography, "Pitt Press," Cambridge, is interesting. The views by Truefitt Brothers are very feeble in tone. To the Indian Views by W. Hamilton Crape, we are not inclined to award such a high meed of praise as has been bestowed upon them in some quarters. As views of celebrated places in India they have a great historic interest, but in executive skill they are far below others which we have seen. Crittenden's views have many good points about them, but, generally speaking, they are too intense in tone. We may just mention one, "The Baptistry, Canterbury Cathedral" (97), which at once calls to mind Bedford's beautiful photograph of the same. The French views by the late Robert Howlett have the distinguishing beauties which marked his works. The present series of views of buildings are more like copies of elaborate ivory carvings than anything else. Dixon Piper has some good landscapes, although they are not superior to what we have seen by him on other occasions. B. B. Turner we are glad to see continues to adhere to his "Talbotype," and gives us some very clever and interesting views, which make us regret that he is almost the only adherent of this beautiful process. Mr. Melhuish does not appear to have done much for the present exhibition; his landscapes, in many instances, are not equal to what we have seen by him before. To the geologist, Gutch's photographs must prove of the greatest interest.

The show of architectural views is not so large as might have been expected; no doubt the knowledge of the fact that an exhibition formed exclusively of architectural views was about to be formed, would influence photographers, and cause them to abstain from exhibiting here this class of views. The finest view in this way is one of Rome. It is on a very large scale, and is a grand and striking feature in the room in which it is placed. It is immediately over a panoramic view of Cairo, by Frith, and the contiguity of the two is by no means favourable to the patched, uneven tone of the Cairo view. Frith's views are of the same character as those we have noticed before. Fenton's interiors are fine, with a great amount of soft, clear tone. There are several views by Cade, much the same as those in the other exhibition already noticed. In sculpture copying, Fenton still stands unrivalled in the ancient department, while, in copying modern works, Jeffrey seems to be the best; witness the copies from Woolner's bust of Tennyson (167). Picture copying, apart from the Raffaelle Cartoons, is not strongly represented here. Bingham's copies, from Paul Delaroche's drawings, are among the leading attractions. There are two beautiful copies by Howlett. The four copies of engravings contained in frame 198, by William Best, are about the nicest and most successful we have ever seen; the black tone in them is much better adapted to copies of engraving, than the brown one which is seen in Fenton's copies. We must not omit to notice the beautiful little views by Maxwell Lyte. The combination of atmospheric effect, the beauty of his clouds, and the detail of the landscape, cause us to suspect that they are compositions, rather than actual views from nature. Ross and Thompson still continue to prepare botanic studies for artistic foregrounds, though on a larger scale than heretofore.

What could have induced the Rev. J. M. Raven to exhibit his two views, "Pierrefitte" (86), and "View near Luz" (87), we cannot conceive: there is not the slightest pretence to anything like detail in them; they are, in fact, pure and simple blacks and whites. R. Ramsden has some interesting little landscapes, remarkable for clear printing, as "The Vale of St. John, Cumberland" (184), which is rather vigorous in tone. Dr. Holden, we regret to find, only exhibits a few very small views of Durham.

Many well-known photographers are unrepresented, such as Lake Price, W. M. Grimsby, J. D. Llewellyn, and others. We are sorry for this. In looking at the beautiful little picture of "The River at Penllergau" (288), we thought we had fallen upon one of Mr. Llewellyn's choice views, but a reference to the catalogue informed us that it was the work of James Knight. Sedgefield's stereoscopic views, of which we have spoken at length, are here side by side with "The Stereographic Views in Brittany," by Henry Taylor and Lovell Reeve; the latter have, indeed, among them the best we have seen for some time.

(To be continued.)

OF THE CHEMICAL INFLUENCE OF LIGHT ON CERTAIN BODIES.*

BY M. E. CHEVREUL.

It remains to be proved if the oxygen receives from the light an analogous modification to that attributed to it in the condition of *ozonised oxygen;* or if the light acts simultaneously on the oxygen and the substances in contact with it. The first supposition would be demonstrated, if oxygen, submitted to the action of the light, and placed afterwards in obscurity in contact with coloured substances, decolored them. In the contrary case, the effect would be due to the simultaneous action of the light, oxygen, and sometimes humidity, without its being necessary to have recourse to *ozonised* oxygen; this is the opinion that M. Cloëz supports.

The facts contained in M. Niépce's last paper are important, not merely from their connection with the questions attaching to the knowledge of the chemical phenomena produced by the sole or assisting action of light, but likewise, and this is their especial novelty, in that they concern its immediate action, its *dynamic power*.

The demonstration of the fact, that an insolated body, such as a cylinder of white pasteboard, acts in darkness on bodies at a distance from it in the same manner as light emanating directly from the sun, is of primary importance; and M. Niépce has proved that the insolated pasteboard, preserved in darkness in a tinned-iron cylinder, retained its activity at the end of six months.

This discovery leads to the question if—in the remarkable

* Continued from page 219.

experiment in which M. Nièpce placed on the edge of a broken porcelain plate a solution of nitrate of silver or chloride of sodium, which he afterwards insolated, and which, after insolation, he carried into the dark room, and washed with a solution of chloride of sodium or nitrate of silver, which gave rise to a violet chloride of silver—it is the insolated porcelain, dry or humid, which is the primary cause of the phenomenon, if the insolation bears on the nitrate or the chloride, or on both of these two bodies exposed to the sun. In the event of the first supposition being the case, the insolation of the dry or humid plate, without nitrate or without chloride, would suffice for the colouring of the chloride produced in the vacuum.

The observation of the nitrates of uranium and copper, the solutions of which leave an almost colourless trace on paper while it remains in the dark, but which become of a brown colour in the light, and which part with this colour on being restored to obscurity, and that a great many times, is certainly a remarkable phenomenon.

To M. Nièpce is owing the discovery of a great number of bodies which are susceptible of acquiring by insolation the activity proper to the light.

It remains to be seen if a distinction may not be made between :—

1. An activity proper to a fixed inorganic body which experienced no chemical action during the time that it preserved its activity in obscurity: such would be porcelain absolutely deprived of organic matter, which should become active, dry or humid, under the sole influence of the sun, and which would manifest its activity at a distance and on contact in obscurity.

2. An activity being the result of a slow chemical action, that would be determined by light in insolated bodies, whether that, these bodies being compound, the action was exercised on their actual elements, or whether these bodies underwent this action with the concurrence of the medium in which they might be plunged.

Finally, the observations by which M. Nièpce has shown that an action which is commenced under the influence of light is continued in obscurity are very interesting, by the connection which they have with two observations made previously on living plants.

The date of the first of these observations goes back as far as 1810; I made it with M. Hirbel, when we repeated Hale's experiments on the ascension of the sap in a branch of the vine. I summed it up in these words in the *Journal des Savants* of 1822:

"Once that external causes have determined the movement of the juices in the trees, these juices, notwithstanding a decrease in the temperature of the atmosphere, continue to move during a certain time, after which, if external circumstances continue unfavourable to vegetation, their movement diminishes until an epoch when, external causes again becoming favourable, they are acted upon anew."

The second belongs to MM. Cloëz and Gratiolet; they observed that aquatic plants which did not begin to give off oxygen till the temperature was at 59°, plunged in aerated water containing carbonic acid, and exposed to the light, continued to give it off at a temperature which had gradually sunk to 50°.

Last year, on my proposition, the Academy willingly agreed to refer the labours of M. Nièpce de St. Victor to the future commission, which will be appointed to decree the prize founded by the late M. Bordin. I have now the honour to propose, that the new researches of M. Nièpce may be referred to the same commission.

The proposition was adopted.

PHOTOGRAPHY IN ALGERIA.—No. IV.

My dear Sir,—I suppose you have almost forgotten my existence, it is so long since I wrote to you; but the fact is that, unless I were to go into general subjects, which would be out of place in the columns of the "Photographic News," I have very little to write to you about.

Before leaving Algiers I made a purchase of the wagon I had borrowed on an occasion which I have already described, thinking it would be useful to me for a similar purpose, as well as to convey my baggage and apparatus to Hamed's douar. I was delighted when the morning came for us to start. Ever since I read, when a boy, the delightful journeyings of Mrs. Jarley, in "Humphrey's Clock," I have had a longing for vagabondising in a similar manner, and hence I was delighted when the opportunity came of gratifying that desire; besides, it really is a capital mode of locomotion for a photographer in a country where roads are scarce, and railways have no present existence: moreover, it is almost indispensable in a country where one might travel forty-eight hours without meeting with an opportunity of renewing the supply of water—a matter of some importance to a photographer who likes no process so well as the wet collodion. I do not mean to say that good results may not be obtained by the dry collodion process, for I have been trying both Norris' process and Fothergill's. Of these two, I rather prefer the latter, but both have given me some annoyance at different times; so that, as long as I can make it possible to employ wet collodion, I shall do so. Before starting, therefore, it was essential I should have with me the means of carrying a good supply of water in case of necessity, and, at the same time, I had not space for any bulky vessels. The means I adopted were as follows:—I got several yards of canvas, which I stretched by fastening a rope to each corner and passing them through staples in the wall in a corner of the courtyard of the hotel. I then boiled some linseed oil, into which I had put a certain quantity of resin, and afterwards laid a coating of it on the canvas with a brush, which I then left to dry in the sun. I repeated this process three times, after which it was completely waterproof, as I ascertained by loosening the ropes at one end and letting the canvas hang down, so as to hold seven or eight gallons of water, which I poured on it. The next thing was to convert this canvas into bags, in such a manner as to make them suitable for my purpose. First of all it was advisable, though not absolutely essential, that I should be able to regulate the flow of water from the bag; and it occurred to me that this would be best accomplished by inserting a rough tap, made of wood, in its mouth. After inquiring at a good many shops, I found something of the kind I wanted, and which I think is called in England "a spigot and faucet." I next cut the largest circle possible out of the canvas, gathered the edges up round the tap, and tied it round very firmly with waxed string, and the bag was complete; I could pour the water into the bag through the tap. In this way I made four of these bags, all of which, by a simple arrangement of pieces of rope in the way in which countrypeople are in the habit of supplying the loss of a handle to their pitchers, could be slung from different parts of the wagon, and thus occupied no space in the interior; they had, too, the additional advantage of being available for slinging over a horse's back when occasion required. I have dwelt at some length on this subject, because I think a contrivance of this kind might be useful to a good many of your readers who may practise out-door photography.

Our party consisted of myself, Hamed, an Arab driver, and two others, with a couple of saddle-horses. My wagon was well filled, considering that I intended to use it as a dark room when opportunity offered—for Hamed had bought a quantity of rice, besides a lot of other things, for his domestic consumption. The first day we made a good distance, and at night halted at the house of a friend of Hamed's, who received us hospitably enough; but I should have made but a very poor meal if I had not taken the precaution to put a few loaves I had bought at a French baker's, before leaving Algiers, into the wagon, together with some tea and coffee. It was not that there was deficiency in the quantity of food, but it was the manner in which it was devoured that disgusted me. Just fancy some fifteen or sixteen of us seated in a circle on the ground; in the midst of us there is an enormous tub of rice, which I believe to

have been boiled with the sheep whose carcase is in the midst of it, and the whole then turned out of the cauldron together. Out of compliment, I suppose, to my character of guest and foreigner, I had been furnished with a wooden spoon, but none of the others present possessed such a superfluous implement, nor did they appear to desire anything of the kind, but got along wonderfully by plunging each his hand into the tub and withdrawing it filled with rice, varying the operation at intervals by tearing off a piece of meat. I am not *over* nice in such matters, usually contenting myself with "doing at Bolong as Bolong does," but I certainly did feel rather sick at the thought of going into the tub myself. My host saw that I did not seem sufficiently sharp in securing my portion; so he took my spoon, and, stirring up a portion of the rice with a due proportion of the liquid, precisely in the manner in which I have seen little boys manufacture dirt pies at home, he ladled it into a wooden bowl, and handed it to me, with a piece of meat which he had torn off with his fingers. I looked at the mess, and didn't at all like the idea of eating it; but the reflection that he would be offended if I did *not* eat it, gave me courage to attempt it—and then I was so very hungry—that I made a determined effort, and succeeded in swallowing what he had given me, but he could not prevail upon me to take any more. It was not bad, this Kouakousoo; and now that I have got a little used to it, I like it very much—though the difficulty of making oneself like it is not overcome after the first step, as it was in the case of St. Denis, who walked a league with his head under his arm.

After every man had satisfied himself, the remains were carried into the women's apartments. I hope there were not many of them, for if there were, they must have made a very scanty meal; and as for the dogs—of which there were about a dozen apparently half-starved savage animals—they must have come badly off. All the time we were eating, they had been yelling, barking, and fighting, as they prowled with hungry looks round the circle; and more than once an Arab had been ordered by his master to quiet them; but the method he employed to accomplish this only made them howl the louder, for he struck them savagely with a piece of wood, which it would be using too mild a term to call a bludgeon.

As soon as the remains of the dinner had been cleared away—and this business was very soon performed—I made an excuse to go and look after the wagon, which had been drawn up near the door, and finished my supper on one of the loaves, very much in the manner of the celebrated Mr. Jack Horner. When I had had enough of this, I took a paper of coffee from my store, and begged that it might be made into a liquid for the benefit of the company, and at the same time I handed my tobacco-pouch to a few of the guests who appeared of more importance than the rest, and serious smoking was at once commenced. I am not going to sing the praises of tobacco, which would perhaps be a little out of place in a photographic publication, inasmuch as it is not used in any photographic manipulations with which I am acquainted (though it may be said to possess, to a certain extent, photographic qualities; for instance, it is powerfully acted upon by the solar rays when they are concentrated with a lens, and under their influence changes its colour and condition); yet, I am sure, that the most rabid opponent to the use of the noxious weed—even the distinguished author of the "Counterblast" himself—would take to smoking if he lived among the Arabs. The night was so warm and pleasant, that we seated ourselves on the ground out of doors; and, except when I exchanged a few words with Hamed from time to time, the most profound silence reigned for nearly two hours. I began to think of retiring to my wagon for the night, when suddenly, without any warning, an old Arab began a narrative about a young woman who was very beautiful, and very proud of her beauty. One day she went into the wood near her father's hut to pick up sticks, and was just about to return home with a bundle when she saw a lion, who was regarding her very attentively. Women are women all the world over, and her first act therefore was to scream. The noble animal seemed grieved by the want of confidence in the purity of his intentions which this act indicated. He looked at her appealingly; and there was such an expression of admiration in his leonine face, that she could not help seeing it in spite of her fears. She took up her sticks (a more vulgar historian would perhaps have said that she "cut her stick") and walked, though with a good deal of fear and trembling, to her father's hut, the lion accompanying her all the way, and behaving like a gentleman. Some days elapsed before she had the courage to go again; when she did, she found her new friend had not forgotten her: but this time she was not much frightened; she saw that he was in love with her, and, with the natural instinct of a woman in such a case, she sought to convert him into an ass. It would be too tedious to follow the Arab in all the circumlocutions of his tale, showing how she accomplished this praiseworthy object, but I shall go at once to the *dénouement*. One day, with a vain desire to test the strength of his affection, she pretended to take offence, and chopped his head open with a hatchet. The poor beast bore this suffering and indignity with the meekness which characterises lovers of the "Moddle" kind, and staggered away with a resignation which would have melted any heart but that of a woman too vain to think of anything except her beauty. She had not seen the lion for some days, and began to think that the chop had been too much for him to digest, when, as she was walking thoughtfully along, she saw him approaching. This time his countenance was changed; and, instead of the mute lover, it was the angry avenger who thus addressed her:—"Ayeshu, I have loved you long. I have borne with patience the contumely you have heaped upon me. When you struck me, I did not resent it—and why was this? Because I loved you, Ayeshu. But what was that which I heard you say this morning in your father's hut? that I was an ugly brute, an unclean feeder, dirty . . . . . . I forgave the pain you inflicted on my body, but I cannot forgive the pain you have inflicted on my pride." So saying, he took her in his mouth, and disappeared with her in the wood, and she was never more seen of mortal man.

MORAL.—It is easier to pardon personal injuries of any description than to forgive an offence against our self-love.

C. A.

ON AMMONIACAL COLLODION.

BY P. C. DUCHOCHOIS.

THE new preparation of collodion (which was published in vol. i. p. 146 of the "PHOTOGRAPHIC NEWS") can be so well appropriated to dry processes, that I tried to render it as perfect as possible—indeed, employed with uniodised preservative, or with iodised gelatine and albumen, as well as without any kind of preservative, that collodion has often given as good results in the numerous experiments I have made. There has never been any raising or any blistering. However, it will be found that is not durable, for it does not keep in good condition more than a week or two—the ammonia decomposing the pyroxyline so powerfully, that the film becomes without consistency, and very opaque. It is therefore necessary to neutralise the action of the alkali in order that the collodion may keep as long as any other. Acetic, hydriodic, and hydrobromic acids answer that purpose very well, and do not change the properties that render this collodion so good for dry processes; but what is equally important is, that whether the iodide or bromide of cadmium (or any metallic base, iron excepted) are employed in its preparation, it does not thicken as collodion prepared with those iodides according to the ordinary formula, thus removing the only objection to the use of metallic iodides and bromides in negative or positive collodions for *wet* or *dry* operations. It even seems that the very porous and divided state of the film is more propitious to the sensitiveness of the preparations, and determines a greater intensity of the

negative. It is also worthy of remark, that, the ammonia rendering the collodion very fluid, almost every soluble pyroxyline can be employed to prepare it.

The improvements made in the collodion are the following:—To prepare the plain collodion by adding a few minims of liquor ammoniæ, which is left to set four or five hours; then—1. To neutralise with acetic acid if the collodion is not to be iodised, but merely serve as a support to gelatine or albumen, as in the processes of MM. Gaumé, Bayard, and Crookes. 2. If the collodion is to be iodised, to neutralise with hydriodic or hydrobromic acid, and to add some carbonate, and filter, after having shaken for one or two minutes. The modified formula for dry collodion, which may be used with or without uniodised preservative, is—

Ether, sp. gr. 0·72	... ...	6 fluid drachms.
Alcohol, sp. gr. 0·809	... ...	2 "
Pyroxyline (either)	... ...	6 grains.
Liquor ammoniæ	... ...	2 minims.
Bromhydric acid	... ...	4 to 6 minims.
Iodide of zinc ...	... ...	4 grains.
Bromide of cadmium	... ...	½ "

The silver bath and developer as in my former communication.

"VOL À LA PHOTOGRAPHIE."

The competition among individuals calling themselves photographers, in Paris, is so great that portraits are taken at 20 sous and even at 15 sous each. Under these circumstances the number of portraits taken is so great that it is not an unusual thing for these so-called photographers to call at people's houses and offer their services; and recently some of those gentlemen, who get their living by preying upon others, have adopted this contrivance for getting admission into houses from which they generally contrived to carry away something they did not bring with them. The *modus operandi* is thus described by a witness against two of these persons, Rousin and Chambard. "I was sitting in my room when the prisoners came in and offered to take my portrait cheap, and one of them pulled out some specimens and showed me. I told them I was not in the humour, upon which they apologised and left; but they had scarcely left my room when I missed my watch, and ran after them and demanded it. As they refused to give it up, I called out *thieves*, upon which one of them held me by the arm while the other ran back and threw it on the bed; and when the policeman arrived, naturally enough, they denied having the watch."

Fortunately for Chambard he had the protection of a gentleman calling himself a member of a provincial academy, who, after asserting that Chambard was as incapable of committing the offence as he was himself, concluded his letter by saying—"And this is the poor, the honest man, that the precipitate and rash deposition of a woman . . . . has caused to be placed under lock and key, a prey to the rigours of cold, *to the privations of hunger*, and the tortures of a wounded spirit." This appeal on his behalf had the effect of saving him from present condemnation; while his accomplice received a sentence of two years' imprisonment.

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—*(continued.)*

Alabastrine Photographs.—The same material is used for colouring these as for ordinary glass positives, with some slight modification, however, of the method to be pursued. It is better to varnish the picture before colouring, for more than one reason. In the first place, from the peculiar surface, it is generally easy to secure sufficient intensity of colour by one application. A more important reason still for varnishing first, arises out of the powdery nature of the lights in these pictures, which renders it difficult to colour them without scratching or abrading the surface by almost every movement of the brush. Varnishing with a proper varnish renders this surface tough and hard, without in any degree diminishing the purity of the whites, whilst it gives depth and transparency to the shadows, and renders the surface the finest that can possibly be had for receiving dry colours. The same method of colouring, already described, will then be pursued, with additional care, however, in applying the tints of the necessary depth in the first colouring. From the delicacy of these pictures, it is especially important that pure tints be used, as bad colours or careless manipulation become glaringly apparent; while on the other hand, with care and skill, the very finest and most artistic results may be produced. After colouring the picture throughout, if additional brilliancy or intensity be desired, the picture may be varnished again without in any appreciable degree diminishing the intensity of the tints already applied; the picture may then be recoloured throughout. These pictures should always be backed with dark velvet,—maroon is best,—instead of black varnish.

Finishing the picture.—We have now conducted the reader through all the steps of colouring positives on glass. A few finishing touches will generally be required to complete the picture. After colouring the draperies and background, once more return to the face, the colouring of which will generally appear somewhat modified by the effect of the surrounding tints. Re-touch such portions of the face, hair, or draperies, as may seem to require additional intensity, and soften, with a clean, soft pencil, such points as appear too glaring.

The colouring completed, take a clean pencil with a fine point to remove such portions of colour as may accidentally have touched and adhered to parts not intended to be coloured. Some care is necessary in doing this, as there is danger of rubbing the colour in, and causing a smudgy mark, instead of removing it. The pencil should be applied very lightly, and may sometimes be slightly moist, or, what is better, slightly greasy from touching the skin, so that the colour will readily adhere to it and leave the plate. This completes the work.

Mounting, &c.—A few words regarding the fitting, mounting, &c., of coloured pictures, may not be altogether inopportune here. No *entourage* so completely harmonises with a coloured picture as a gilt mat or spandril; and in respect of glass pictures generally, as they are more suitable for cases than for any other kind of fitting, they are mostly surrounded by the gilt mat. We regard them as most suited for cases for this reason: they are distinguished by delicacy rather than by vigour or breadth, and their beauties are best seen by close inspection. With the exception of the alabastrine photographs, very few glass positives have sufficient vigour to serve any purpose in ornamenting the wall of a room. Where they are intended for such purpose, however, it is important that they should be suitably mounted. Nothing can be worse than the passe-partouts usually sold for the purpose, which are generally either black or white. The whites of an ordinary glass picture will rarely bear proximity with the intense white of the passe-partout without being "killed," as it is technically termed. The contact with black is scarcely better, as it has the effect of impoverishing all the shadows. A light neutral tint would answer the purpose much better, and a gilt mount best of all. We have seen some English passe-partouts, with broad margin, made of the common sand gold-paper, which answer the purpose admirably well. Being made into passe-partouts, and thus protected by the glass and sealed edge, there is no danger of the bronze powder, with which they are coated, discolouring. For those to which we refer an absurdly high price was charged; but there are, surely, enterprising manufacturers to whom it would be worth while to step out of the common track, and produce something of the kind at a reasonable price.

(To be continued.)

Photographic Chemistry.

CHEMICAL MANIPULATIONS—(*continued*).

Filtration (*continued*).—Sometimes the liquid to be filtered is thick or viscous, like albumen, solutions of gelatine, and those which contain starch in suspension; all these filter very slowly, so that in certain cases there is a possibility of changes taking place during the operation, as in the case of collodion, for example, by an unequal vaporisation of its constituent parts. In such cases, filtration may be hastened by atmospheric pressure; this may be effected by a very simple contrivance, such as passing the neck of the funnel through a cork fitting into the opening of an air-tight vessel placed to receive the liquid, from which the air is exhausted by a very simple contrivance; but as the student could not construct this apparatus for himself with any advantage, it is not necessary that we should minutely describe how it is accomplished. The piece of cotton or tow should be thrust lightly into the neck of the funnel, and, as the pressure upon it will be considerable, it is a very good plan to place previously a piece of bent silver wire in the neck of the funnel, to prevent the tow from being sucked down too tightly in it. In this way the thickest liquids may be filtered with great rapidity.

The next process we have to consider is, *crystallisation*. Certain substances dissolved in water are recovered by the cooling of the liquid, or by evaporation, when they will be found to have changed their shape, and to have assumed beautiful and regular forms—they are crystals. These crystals take a certain form proper to the substance crystallised; and though the same body may yield crystals of more than one form, yet it will invariably be found to assume one or other of the forms peculiar to itself, and not that of a different body. The regularity in the shape of the crystals will be greater in proportion as the operation was performed slowly, and while the liquid was preserved from all agitation. The principal use of this tendency of certain substances to assume a crystalline form in photographic chemistry is, to insure the purity of the chemicals. When this is the object, it can best be attained by agitating the liquid occasionally during the cooling, so as to fracture the nascent crystals, and obtain them in as minute a form as possible; after which, they must be washed in cold distilled water to free them from the mother-liquor, and spread on blotting paper to dry. To produce crystallisation, it is sometimes necessary to reduce the temperature of the liquor almost or quite to the freezing point, and, in other cases, to boil it until it has evaporated. The most trifling causes occasionally determine the crystallisation: for instance, if we saturate a quantity of hot water with that familiar substance known as Glauber's salt, and then pour the hot solution into a glass globe, the mouth of which we close by tying over it two or three thicknesses of wet bladder, we shall find that so long as the globe is preserved from agitation, the liquid will remain free from crystals; but if we untie the bladder, or drop in a single crystal of the same salt, or touch the surface of the liquid with a metallic point, or even violently agitate it, crystallisation will at once begin, and gradually extend downwards, until the whole becomes a solid mass.

Precipitation.—To precipitate a body is to separate it from its solvent, either by making the one or the other undergo a purely physical change, or, as is most usual, by inducing a chemical change on the constitution of the solvent, or of the body in solution: thus, in the case of nitrate of silver dissolved in water, the metal is precipitated by being converted into an insoluble chloride or iodide of silver.

These precipitates being always impregnated with liquid, it is necessary to purify them by washing. The washing may be accomplished by means of the filter, or by decantation by means of water, or any other suitable liquid.

(*To be continued.*)

Dictionary of Photography.

AMPHITYPE.—This process is a discovery of Sir J. Herschel's, and receives its name from the fact, that both negatives and positives can be produced by one process. The positive pictures obtained by it have a perfect resemblance to impressions of engravings with common printers' ink. The process is difficult, and has not been much carried out; and, as yet, pictures by this process are only to be met with as curiosities.

ANALYSE.—To resolve a body into its elements; to separate a compound substance into its parts or proportions for the purpose of examining each separately; to separate a compound body into its constituent parts.

ANGULAR APERTURE OF A LENS.—The angle formed by the converging pencil of rays transmitted by the lens; or, the proportion between the focal length of the lens and its working diameter.

ANHYDROUS.—Perfectly dry; destitute of water either mechanically or chemically combined.

ANIMAL CHARCOAL.—A common article of commerce; known also as *ivory black*. It may be prepared by burning ivory or bone shavings in a closed crucible. It is employed in photography to decolorise solutions of silver which have been used with albumen. It is only necessary to pour the nitrate of silver upon a tenth part, by weight, of animal charcoal, boil the whole for a short time in a porcelain capsule, and then filter. We do not, however, recommend it, as *kaolin* is far preferable.

ANTHOTYPE.—A process discovered by Sir John Herschel, and founded upon the sensitiveness of the expressed juice of flowers. Certain precautions are necessary in extracting the colouring matter of flowers. The petals of fresh flowers are to be carefully selected, and crushed to a pulp in a marble or porcelain mortar, either alone or with the addition of a little alcohol, and the juice expressed by squeezing the pulp in a clean linen or cotton cloth. It is then to be spread upon paper with a flat brush, and dried in the air without artificial heat. If alcohol be not added, the application on paper must be performed immediately, as the air (even in a few minutes) irrecoverably changes or destroys their colour. If alcohol be present, this change is much retarded, and, in some cases, is entirely prevented. Most flowers give out their colouring matter to alcohol or water: some, however, refuse to do so, and require the addition of alkalies; others, of acids, &c. Alcohol has, however, been found to enfeeble, and, in many cases, to discharge altogether these colours; but they are, in most cases, restored upon drying when spread over paper. Papers tinged with vegetable colours must always be kept in the dark, and perfectly dry.

APERTURE.—The diameter of the available opening in front of the lens, whether its full opening, or the size of a diaphragm.

APLANATIC.—This name has recently been applied to a form of view lens, in which the aberrations are almost entirely corrected, and the images of distinct objects formed more nearly on a plane, than by any other combination extant.

APPARATUS.—A term applied without any distinction to the implements, instruments, &c., used in photography.

AQUA-REGIA.—A mixture of two parts of hydrochloric acid and one part nitric acid, each pure and concentrated. It derived its name from being the only liquid which would attack gold—the king of metals.

AQUEOUS.—Watery; partaking of the nature of water; prepared with water.

AQUEOUS SOLUTION.—Any substance dissolved in water.

AREOMETER.—Another name for the hydrometer, which is an instrument by means of which the specific gravity of solutions is measured.

ARGENTINE.—Resembling silver; pertaining to or containing silver. Derived from *argentum*, the Latin for silver.

(*To be continued.*)

A Catechism of Photography.

DEVELOPING THE IMAGE.

Q. How is the collodion picture to be developed after exposure in the camera?

A. It must be removed into the dark room, taken from the slide, and placed on the levelling stand. Great care is necessary in conducting this operation; as even the warmth of the fingers in taking the plate from the slide will sometimes render the picture more energetic in some parts than it is in others.

Q. How is the developing solution prepared?

A. Various formulæ are given; amongst them are the following:—

Distilled water	250 parts.
Pyrogallic acid	1 part.
Citric acid	1 part.

Or—

Distilled water	250 parts.
Acetic acid	20 parts.
Pyrogallic acid	1 part.

Or—

Pyrogallic acid	10 grains.
Distilled water	5 ounces.
Glacial acetic acid	1 drachm.
Spirits of wine	½ drachm.

Mixed, and thoroughly filtered.

Q. How is the developing solution to be applied to the plate?

A. It must be poured over it until the whole surface is uniformly covered in every part.

Q. Is not that part on which the solution is poured likely to be more affected than other parts of the plate?

A. In order to avoid this, it is desirable not to hold the vessel from which the solution is poured too high; also to move the hand in pouring the solution, and gently to blow upon the surface of the plate.

Q. What purpose is answered by blowing on the surface of the plate?

A. It has the double effect of diffusing the solution more evenly, and causes it to combine more freely with the damp surface of the plate.

Q. How is the photographer to ascertain when the picture is sufficiently developed?

A. This is only to be ascertained by observation: but, in order to facilitate these observations, a piece of white paper may be held beneath the plate, the result of which is, that the condition of the picture can be clearly seen.

Q. Is not a little nitrate of silver sometimes added to the developing solution?

A. Yes; from eight to twelve drops of a fifty-grain solution of nitrate of silver may be added to half an ounce of the developing solution.

Q. In the formulæ for the developing solution, mention is made of acetic acid in one instance, and of citric acid in another. Which is considered the best?

A. Opinions vary on this subject. The development of the picture by either process is rapid, but is more rapid with the acetic acid than with the citric acid. It may also be observed, that the blacks given by the citric acid are more transparent than those given by the acetic acid, and this difference is still more observable in the proofs.

Q. In cases where the development is not so successful as could be desired, what remedy would you suggest?

A. In some instances it is found useful to re-dip the plate in the solution of nitrate of silver, as the development is not likely to be successful unless the surface of the plate is well moistened.

Q. Is not the sulphate of protoxide of iron employed in developing collodion?

A. This agent is occasionally employed, and the solution is energetic—instantly developing the picture. This rapidity of action has no particular advantage, as it is difficult to manage it with that care which is so essentially necessary for the production of a good picture. The solution is composed of—

Saturated solution of sulphate of protoxide of iron	100 parts.
Water	500 parts.
Acetic acid	20 parts.
Spirits of wine	20 parts.

Q. Is the development of the picture by the application of this solution instantaneous?

A. No; the picture is gradually developed. If the intensity is not so great as is desired, the solution may be poured off, and a solution of nitrate of silver added.

Q. Must the iron solution be previously prepared?

A. The saturated solution of the sulphate of protoxide of iron should be prepared some time before it is required for use.

Q. Is alcohol, or spirits of wine, essentially necessary to the solution?

A. The spirits of wine is not indispensable, but it serves to spread the liquid more uniformly over the surface of the plate.

Q. When may the picture be considered sufficiently developed?

A. When the blacks are well brought up, and the whites fully and clearly seen. Full effect in the light and shadow is necessary to constitute a good picture.

Note.—The cubic centimètre is a French measure of capacity equal to seventeen minims, apothecaries' fluid measure.

(To be continued.)

Correspondence.

ALABASTRINE PROCESS.—RESTORING FADED PAPER POSITIVES.

Sir,—In vol. i. p. 180 of the "Photographic News," I see my initials quoted as being connected with a communication to another journal on the alabastrine process, which is the same as I sent to you, and published in vol. i. p. 81. I see it is in your "Almanack." A solution composed of—

Chloride of ammonium	80 grains.
Bichloride of mercury	10 "
Protosulphate of iron	20 "
Nitrate of potash	12 "
Distilled water	1 ounce.

answers very well for redeveloping faded positives on paper if not gone too far. I had a number of stereograms that were quite yellow, which I treated with this solution; now they have a most beautiful purple lake tone. I poured a little of the solution on the picture, and spread it with a glass rod for about two minutes, then washed off under the tap. Lately taking the plates, which, together with mats and preservers, had for some time protected a few positives (the backgrounds of which had been painted with Chinese blue, flake white, and drop black, the blue being predominant), and breathing on the inner side of each, I found an exact copy of the photograph which it covered, the figure being dark and the background light. Can this be accounted for? Light had not been admitted through the picture.

In your "Almanack" you have omitted the very thing that makes old Moore so notorious, viz., Fine and pleasant weather, affording much pleasure for the photographer—Rather unsettled—Photographers had better prepare plates—Thunder may be expected about this time—Photographers will do well to mind their baths, &c.; and the hieroglyphic predicting the downfall of hypo. Jos. B. Robinson.

Macclesfield.

The *Constitutionnel* has a leading article on the damage done to, and the coming downfall of the engravers' art, owing to the rapid strides made in the process of photography as applied to transfer of paintings.

Photographic Societies.

Nottingham Photographic Society.

Exhibition at the Exchange Hall.

Light—one of the essential conditions of existence of nearly the whole of the vegetable and animal life, is now—by the aid of science—made to play the artist, and picture forth the varied phases of nature. It is true, that only *in part* can photography, at present, do this. It is not discovered how to bring out the colour which is said to be latent in the image, neither is it known how to produce *all* the gradations of light and shade as in nature; for instance, a bright yellow against a violet ground would show in a photograph a reversed effect—the yellow appearing dark, and the violet light. This, so far as is known, is owing to the yellow ray of light having the least influence in changing the condition of the sensitised surface, and the violet ray the greatest; but whatever imperfections there may be in this truly wonderful art, it is satisfactory to know they are almost daily becoming less, and that principally through photographic societies.

The alchymists of the sixteenth century, in searching for the elixir of life, stumbled upon the great fact that salt of silver became blackened by exposure to light. In the eighteenth century this remarkable phenomenon engaged the attention of Petit, Chaptat, Dieze, Scheele, Sennebier, Ritter, and Wollaston. Yet but little progress was made in the science until Wedgewood, Sir Humphrey Davy, Nièpce, Daguerre, Sir John Herschel, Fox Talbot, Hunt, and others astonished the world from time to time with their discoveries. It is but a very short time ago that the scientific world considered it to be a marvel that a portrait could be taken in *only half an hour*. What should *we* say to that at the present day, when for sixpence, and two or three seconds of time, Dick may get a "tografy pictur" of his friend Bill, and honest Jack Tar, a "kreot likeness of Nancy;" and the wealthy individual may fill his portfolios, and, by the fireside, mentally travel over the world, and see the temples and pyramids of Egypt, the cities of Palestine, the ruins of Rome, the beautiful architecture of Venice, Alpine snows, and the desolation of ages on Teneriffe, where, 12,000 feet above the sea, amidst pumice and trachyte lava, flourishes the deep-rooted *retama!* The English landscape, with every leaf and blade defined with microscopic beauty, and the impetuous rolling wave ere it falls, are pictured, the latter, with all the delicacy of its spray work. If nature can work such pictures as these—what a world of beauty becomes this "very dull work-day world"—what an occupation for an intelligent mind—what a means of general improvement by permanent exhibitions—what a lesson to those who have the habit of regarding the sky as so much ceiling, and valuing green fields and forest trees at so much per square yard and cubic foot! The very stones preach sermons, and groups of wayside weeds which one is apt to pass by without the slightest notice, become a picture of loveliness, and the wonder is they were never so seen before.

The character of every age is stamped upon it by the works and thoughts of the people, and as regards the present, although in some things there may be a tendency to suck the egg of knowledge by making an *incision* at the *apex* and another at the *base*, instead of *merely making a hole at each end*, it can, nevertheless, claim many improvements upon the days of "Auld lang syne," by three extraordinary discoveries, viz., the Telegraph, the Rail, and Photography. A thought is decked with electricity, and sent to its destination in a few seconds. Timothy Tomkins, Esq., breakfasts with a friend in London, and dines with another in Edinburgh. A bit of glass is stuck in a dark box, and, by the aid of chemistry, the fleeting lights and shades of the sun-lit landscape are instantaneously arrested. We can fancy the incredulous looks of our venerable grandfathers and grandmothers, and the lengthened visage of doubt and unbelief of even the man of science, if the wonders of the day we live in had been predicted to them; and of all the departments of science, perhaps none have made such rapid progress within a few years as photography.

As might be expected, in many productions of the photographic art, there is want of taste and artistic feeling. No greater illustration of the value of art could be given than a mixed collection of photographs; and although the works in the Nottingham exhibition are of average high merit, we have only to compare Rejlander's "Home, sweet home," and his two studies from a child, called "Perception and Contemplation," and one or two of Robinson's works, and Sidebotham's "Bridge at Strines," Fenton's landscapes, and Woodward's stereographs, with some other productions, in order to be convinced of the superiority that an operator must have, if he can combine art with science. There can be no art in any work that does not prove that the mind has an inward perception of the beauties and capabilities of the subjects—a seeing with the mental eye all that appertains to it; and however laudable it may be to produce a "sharp picture," it must not be forgotten that, when that power is acquired, the real labour of the photographer has only just begun. But in every new discovery, for a time, the manipulative treatment is apt to engross the whole attention, while the aim and purpose are too often lost sight of; like the young painter, who fancies that if he could only mix his colours *right*, he would be able to *paint*, and is disappointed to find that when he *can mix his tints*, he is not nearer to art than before. The celebrated photographer, Delamotte, says: "It is in the hands of the true artist, or man of taste, that pleasing results must be looked for. He who proceeds mechanically in his task may, by a fortunate accident, produce a good picture; and we have abundant evidence to show us that the mechanical treatment of nature is most common and least successful. It is in the hands of artists that photography will attain the highest execution, artists to whom the attainment of *effect* is intuitive, while they themselves will acquire much valuable instruction from studying its results. *Notwithstanding the microscopic accuracy of detail presented in a good photograph, its chief value and excellence will be found to consist in its sacrificing certain details, and in its representing masses of light and shadow.*"

As regards the educational value of photography, it will, no doubt, become universal. Already the Science and Art Department have had photographs taken from Raphael's Cartoons, the largest size being four feet. We learn that the Departments will shortly be prepared to offer them to public schools at a moderate cost. This is a step in the right direction, and it is to be hoped will lead to something better still, viz.,—a permanent exhibition of the arts and sciences, in which the photographic art would necessarily bear an important feature. It would be a place for improvement and intellectual recreation. And no place could be more appropriate than the School of Art, *i.e., when it is built*; and provided the subjects were properly classified, the exhibition would form a valuable resort for reference to the architect, the artist, the mechanic, and to all engaged in industrial pursuits. Such an exhibition, especially if good music was introduced at stated times, would be more likely to draw the working classes from pernicious habits than all the platform laments in the world. We have been led to these remarks from actual observation and experience of the last exhibition of the School of Art, and the present one of the Nottingham Photographic Society, which, we are sorry to say, will close on Saturday.

The subjects which comprise the works exhibited, may be divided into three classes—Architecture, Landscape, and the Figure—and in each class there are some very remarkable and perfect specimens. Architecture is well represented by Le Gray, Bisson Frères, and MacPherson; the large ones by Bisson being most perfect specimens, leaving nothing to be desired, and the illustrations of Rome by MacPherson are most instructive. The "Two Ways of Life" by O. G. Rejlander, must rank among the most extraordinary productions that photography has produced. The attitudes of some of the figures are exceedingly appropriate and graceful, though in other parts of the picture there are several artistic defects. The "Scripture Reader," by the same artist, is a more perfect work. "Fading away," by Henry P. Robinson, has some good qualities, and the girl who has been the model has evidently understood her part, the expression on her face being quite in keeping with the subject. The mother, who has closed the book which she has been reading, and is holding her spectacles on her lap, is simply *looking on*, and might be merely a portrait of a respectable middle-aged lady. The position of the hand holding the spectacles is very good, but the other is bad; it would have been better to have hid that, and placed the book open on the stand in front. This figure is an instance of the great difficulty that photography has

to contend with. (What a world of love and anxiety should have been expressed in the face of the mother, who sees her child fading away!) The single reclining figure, with the words appended, "She never told her love," by the same artist, is a very fine work; the position of the head, the expression of the features, and the long hair falling over the light surface of the pillow, are of high merit. The position of the hand is bad; few people are aware that there may be nearly as much expression in a hand as in a face. The drapery is well arranged. "The Monk," by Lake Price, is a very fine picture; the composition is good, and if it were not for a slight indistinctness in the expression of the face, it would be a perfect work. Maull and Polyblank's Gallery of Celebrities are most excellent specimens of portraiture. Among the number which strike us as being the most remarkable are, Professor Owen, George Cruikshank, Dr. Lyon Playfair, J. Gibson, R.A., C. Stanfield, R.A., John Connolly, Lord Stanley, and the Earl of Rosse. The photographs of Liverpool life, whatever they might have been originally, are certainly spoilt by being badly painted. Some photographic portraits of a large size, and painted over with oil colour, by Redgate, are good: there is rather a heavy appearance about the draperies; the two largest portraits are works of great merit as regards the colouring of the flesh.

Among the beautiful landscapes, which adorn the room, "Home, sweet home," is a charming production, thoroughly poetical, and English in character. A river, some foliage, a solitary cottage in the distance, constitute the materials of the composition. Mr. Rejlander might have set his camera only a few yards off the point of view from which this picture was taken, and have spoilt it; the bit of bank in the foreground is just right. Mr. Sidebotham's small picture of a bridge near Strines is another of the gems, which for delicacy of tone and effect it would be difficult to surpass. Thurston Thompson's studies of trees and lane scenery are very excellent, and well adapted for the artist's studio.

Fenton's landscapes, and Le Gray's sea pieces, with clouds, taken instantaneously, are very beautiful, and display a careful selection of the point of view. The two views of Rouen, by the late Robert Howlitt, and taken with the new orthographic lens, are perfect. There are also some excellent views by the Rev. J. J. Dredge. Mr. Bourne's "Nottingham Castle," "Audhem Church," "Newstead Abbey," and "The Wheat Field," we believe to be among the best which he has exhibited. Dr. Good, of Derby, and Miss Hurst, of Alderwasley, exhibit some good landscapes. "The Doorway at Dunstable Church," by Nowall; "Rocks at Cowden Knowes," by Cotesworth, and the works of Archibald Briggs, Alfred Rosling, the Rev. J. Holden, and Mr. Smith, are remarkable for their beauty, especially some which are done by the calotype process. Frith's illustrations of Egypt and Palestine, exhibited by the Nottingham Photographic Society; and a large collection of framed photographs, contributed through the School of Art, by the science and art department, are an evidence of the instructional value of the art; and the photographs of "The Moon," by Father Secchi, Nasmyth, and J. Sidebotham, of its application to science.

An immense lens, said to be the largest in England, was exhibited in the room appropriated to materials, and a solar camera, both from Atkinson, of Liverpool. Cameras, tripod-stands, dark boxes, slides, a dark tent, stereoscopes, and the finest stereographs, were exhibited by Ottewell, Horne, Thornthwaite, Shepperley, Thompson, and Woodward. The stereographs on glass, from Dr. Hill Norris, of Birmingham, are very fine. Mr. Smith showed, on the evening of the conversazione, one of the largest of microscopes. Mr. Thompson, optician, covered nearly every square inch of a table with achromatic microscopes, lenses, cameras, chemicals, microscopic photographs of the Royal Family, and a photograph of a £20 note, being a marvellous piece of workmanship.

The contributions sent by gentlemen residing in the neighbourhood were numerous, and among them, perhaps, none excited so much attention as those sent by Mr. Henry Walter, of Papplewick Hall. The taste shown by this gentleman in the selection of his photographs is encouraging to photographers who aim rather at producing good and artistic pictures than at producing the largest possible number.

Among the other contributions we have observed the names of Henry Walter, Esq., Charles Paget, Esq., M.P., the Right Hon. Lord Belper, the Rev. R. Miles, the Rev. C. P. Clifford, &c.

The Nottingham Photographic Society has been presented with four beautiful landscapes, by Mr. Alfred Rosling, of Reigate; three landscapes, by Mr. Sidebotham, of Manchester; and the picture in the exhibition, "Fading away," by Mr. Henry P. Robinson, of Leamington.

The prize pictures are:—Class A, "West Door, Southwell Minster," by the Rev. J. J. Dredge. Class B, "Newark Castle," by J. F. Hurley. Class C, a Stereograph, "Cottages at Wilford." The three pictures are presented to subscribers.

It is exceedingly gratifying to know that many gentlemen of this town and neighbourhood are taking a practical interest in photography, and often a leisure hour is employed by them in this fascinating art, in spite of finger-stains, the smell of acetic acid, &c. &c. The productions of Mr. Henry Taylor, Mr. Felkin, Mr. Webster, Mr. Steegmann, Mr. E. J. Lowe, and Mr. J. Hine, fully prove that such occasional employment of time must lead the mind to appreciate the beautiful in nature, and assist in the diffusion of correct taste in art.

F. R. F.

North London Photographic Association.

At the last meeting of this association, some interesting photographs were exhibited by Mr. Shave. They were taken by an American process. Mr. Hannaford made some remarks on this and other similar processes, in which he proposed adopting a slightly different principle to the one usually employed, and greasing the stone first, and then coating it with the sensitive coating. After exposure and fixing, the greasy surface would be left in a fit state to receive the printing ink. A communication was next read from Dr. Hill Norris, on "Dry Collodion Processes." The author first discussed the causes of *blistering* and *stripping-up* of the film; the former, he stated, resulted from the expansion of the preservative substances, and the latter from the presence of too small a quantity of preservative gelatine or albumen. As remedies, he recommended, if the film were inclined to blister, a diminution in the strength of the albumen or gelatine; whereas, if the film had too little adhesion to the glass plate, the strength should be increased. The employment of meta-gelatine was stated to give rise to stained plates and liability to strip off, although it was easier to manage. The next subject treated of was the sensitiveness of the dry plate; this was stated to be uninfluenced in a direct manner by the presence of nitrate of silver or organic salts of this metal. A sensitive collodion plate simply washed and dried was stated to be the most sensitive of all *dry* plates; next to this, and nearly as good, came those prepared with gelatine or albumen. The doctor next entered into some explanation of the chemical composition of the sensitive silver salt. Here, however, Dr. Norris's chemistry does not serve him so well as his photography; instead of admitting candidly that we do not know the real cause of the variations in sensitiveness of iodide of silver, he attempted to explain it, by assuming that the ordinary sensitive iodide of silver was composed of equal equivalents of iodide and nitrate of silver; that the insensitive iodide of chemists was composed of equal equivalents of iodide of silver and iodide of potassium, and that the precipitate produced by adding excess of iodide of potassium to nitrate of silver was a biniodide, containing two equivalents of iodide to one of silver. The error of assuming that bodies in which chemists, with all the delicacy of the present analytical processes, can only detect the elements Ag and I, with sometimes a mere trace of extraneous matter, consist respectively of

$$Ag\,I + Ag\,O.\,N\,O_5$$
$$Ag\,I + K\,I$$
$$Ag\,I_2$$

is very serious, and tends greatly to weaken one's respect for the other branches of science in which Dr. Norris speaks so authoritatively. On the subject of the retention of the invisible image, the author stated that dry collodion plates possessed the singular property of gradually returning to their original condition if kept in darkness for some time after exposure. Damp and other causes facilitated this return; and various chemical vapours also had a deleterious effect on the plate, and thus it was not advisable to delay development longer than absolutely necessary. Under the head of development, the author stated, that, with inferior plates, gallo-nitrate gave more certain results than pyrogallic acid. With the latter developer, five minutes was stated to be the greatest length of

time which should be spent over this part of the operation. The employment of ammonia in the collodion, in order to bring about the desired porosity or rottenness of the film (as recommended in the present number of the "PHOTOGRAPHIC NEWS," p. 233), was spoken of very favourably. Dr. Norris stated that the collodion modified in this manner should contain more iodide and pyroxyline than usual. In conclusion, the necessity of conducting the development in a moderately warm room was insisted on; and in cold weather, artificial heat was recommended to be applied to the plates and solutions. After the reading of this communication, a discussion took place in which the credit of having suggested the existence of the above-named silver compounds was claimed for Mr. Maxwell Lyte by Mr. Shadbolt. A paper was next read by Mr. Hannaford, "On an iron printing process." This is a modification of the *ink process*. Paper is first floated on a solution of bichromate of potassa, ammonia, citrate of iron, gum arabic, and sugar. After exposure, the picture is to be fixed by soaking in water, and then toned and developed; this latter part of the process is one which somewhat entitles it to the attention of photographers, inasmuch as many tints may be produced: gallic acid gives a warm, sepia tint; chloride of gold, applied previously, gives a purple colour; ferrocyanide of potassium gives a blue picture; and salts of manganese, copper, uranium, &c., each gives a picture having a peculiar tint.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

AT the last meeting of this society, Dr. Haines read a paper on the "Uses and Abuses of Photography." He pointed out in detail the various valuable and useful applications of the art: such as portraiture and landscape photography: its application to various branches of the physical sciences, to police purposes, &c.; and then proceeded to detail the various abuses of the art. Under this head he classed the appropriation of the title "photographic artist" by persons who had no knowledge of art or science; cheap portraits, 2d. being mentioned as the price at which photographic portraits might be obtained at some places, 6d. extra being charged for colouring them. The indecent and demoralising pictures, on which the "PHOTOGRAPHIC NEWS" has recently been obliged to animadvert in strong language, were mentioned as another abuse of the art; as also was the habit of Sunday vending which it engendered amongst photographers. As remedies to the above state of things, the author urged the formation of photographic societies, holding periodical exhibitions, reading papers before the Birmingham Photographic Society, and contributing pictures to its album. Mr. Edwards remarked that the practice of pirating photographs, and selling reduced photographic copies of them, was an "abuse" of the art which called for suppression: one or two notorious instances of such piracy were mentioned.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

AT the last meeting of this society, Mr. Taylor read a paper on "Discoveries in Photography." This paper was little more than a history of the art, with a mention of the names of the principal discoverers, alphabetically arranged. Starting from Daguerre, Nièpce, and Talbot, whom he placed in the foremost rank, he enumerated their principal discoveries, and then strung together a very heterogeneous mixture of persons, who would, doubtless, be much surprised to find themselves in each other's company. He concluded by stating that the *ink* process offered one of the most glaring cases of *re*-discovery. It originally belonged to Beauregard; it was then *re*-discovered and patented in this country a year after publication of the process; then *re*-discovered and published as new after the lapse of another year; and lastly, it was again *re*-discovered and published as new a few months ago.

Photographic Notes and Queries.

DEAD BLACK FOR BRASS WORK.

[We have received from numerous correspondents, whom we take this opportunity of thanking, letters on the above subject in answer to our inquiry at p. 228 of the "PHOTOGRAPHIC NEWS." From them we have chosen the following, as containing the most useful information.]

The dead black for brass work is easily prepared, by dissolving shellac in methylated spirits of wine, and adding thereto a little vegetable black. I do not know the exact proportions, but it is not important; bearing in mind, however, that with too much shellac you will get a glossy black, which is objectionable, and that with too little the preparation will not properly adhere. J. H. B.

Procure 1½ oz. of native black, put it on a level stone, rub it into a fine powder, mix it up with turpentine, and grind it very fine (the same as painters grind their colours), then put it into a pot and pour on to it ½ oz. of japanners' gold size, mix it well up, and it is ready for use; it may be put on with a camel hair pencil; will dry in five minutes, and be quite hard in one hour.

If the colour is too black, you may add a little bronze green powder to it, and it will be more pleasant to the eye. The above ingredients may be bought at any colour or chemist's shop; the black is in lumps, in the shape of a sugar loaf. J. B. B.

The dead black used by the best opticians is simply composed of *very finely ground* lamp black mixed with lacquer, and applied *cold*. The work should be previously dipped in dilute acid, to remove all trace of greasiness. To work on which a black surface is required, without the necessity for absolute deadness, bichloride of platinum is used, being applied with a small brush. After a sufficiently deep tone is obtained, the work should be washed in clean water, dried, and brushed with a soft jeweller's brush, previously passed two or three times over a cake of black lead. It may then be lacquered in the ordinary manner or not, according to what may be required. W. H.

The best dead black for brass work that I have been able to obtain (after trying the lamp black with spirit varnish, as recommended in No. 1 of "PHOTOGRAPHIC NEWS," which I found to fail, as also did *lamp black* with 20 other mediums) is (viz.): *best black japan* (not the ordinary japan) carriage varnish, thicken with finely ground *drop black*, on a glass or marble slab, then thin with turpentine: the proper consistency will quickly suggest itself; apply with camel hair brush.

I have found this, as a dead black, to be all that can be desired, viz.: hard, quick drying, will not rub off or shine on friction of cloths, leather, or hands. F. W. EVANS.

CEMENTED GLASS DISHES.

SIR,—If my limited experience is of any value to your correspondents, it is at your disposal. I have made several glass baths, and have had one in use above nine months; it seems to answer every purpose. It is cemented with *Collins's elastic glue* in the following manner:—First grind or make rough the parts to be cemented with emery and water on a flat surface; then make the pieces tolerably hot on a stove (or in any other way); slightly melt the end of the glue at the fire, and rub it on the edges; press them together, allowing the sides to project a little over the ends; let them remain still until cold, then fill up the end with glue; put the bottom on the same way, allowing it to project a little. Should it at any time become leaky, you can slightly heat the part, and it will re-cement itself. The glue is sold by leather-sellers, or where things used by shoemakers are kept. G. C.

GLASS DISHES.

SIR,—I was very glad to read the letter from Mr. George Eddowes at p. 214. In common with many of my photographing friends, I have frequently complained of the wasteful, expensive, and unnecessary width, and slovenly make, of the present class of glass baths. I have tried all the best shops in London, but can find nothing different from

the usual rough, short, and *absurdly wide* glass baths. Well-made, and nicely-shaped porcelain and gutta-percha baths are to be had, and why not glass ones also? which photographers much prefer. It will be a great boon to amateurs if the attention of the glass trade be called, through your columns, to this desideratum.—I am, Sir, your obedient servant, HENRY BONUS.

GELATINE PAPER.

SIR,—On reading, in vol. i. p. 205 of the "PHOTOGRAPHIC NEWS," "Suggestions for the Employment of Gelatine Paper in Photography," another use for it occurred to me, viz., to line the whole or part of the window of my operating room with dark orange-coloured gelatine paper in place of the yellow calico I have used hitherto, which constantly fades. The following queries suggest themselves:—

1. Would it not be about a tithe of the price of coloured glass?

2. Would it not be as effectual in excluding the chemical rays, at the same time admitting sufficient light?

3. Would there be any fear of its fading or curling up under the influence of the sun's rays?

4. Where can it be obtained, and what is the price of it?

R. O. F. S.

ANSWERS TO MINOR QUERIES.

GLAZE FOR PAPER POSITIVES.—Our esteemed correspondent, who answered an inquiry on the above subject in our fourteenth number, p. 167, has forwarded some stereograms, glazed as there recommended. We have carefully examined them, and compared them with highly-glazed pictures by other artists, and have no hesitation in recommending the process to our readers as being capable of producing as glossy a surface as may be desired.

DIRTY YELLOW APPEARANCE ON POSITIVE PRINTS.—*Amateur* has tried the positive-printing process, given at p. 86 of the "PHOTOGRAPHIC NEWS," with much success, the tints, when first put into the water after toning, being nearly perfect; but sometimes during the washing the paper turns of a dirty opaque yellow colour when looked through. This appearance is frequently met with in all the usual printing processes, and is caused by the hyposulphite of silver, which is formed in the pores of the paper when first immersed in the hypo. bath, not being dissolved out by the hyposulphite of soda, and then, in the subsequent operations, decomposing spontaneously with the formation of sulphide of silver, which remains in an insoluble form in the pores of the paper. Knowing the cause, the remedy is obvious:—Increase the strength of the hypo. bath, and allow the print to remain for a longer time immersed in it. We have also found that soaking the print in a solution of one pound of common washing soda in a gallon of water, between the toning and fixing bath, to be very effectual in preventing the occurrence of these stains, whilst it in no way interferes with the ease or certainty of the other parts of the process.

NEGATIVE DEVELOPING SOLUTION PREPARED WITH IRON.—*J. H. B., W. H. W., and others.* The following is Mr. Hardwich's formula for the above solution, referred to by "An Amateur" in a previous number of the "PHOTOGRAPHIC NEWS:"—

Protosulphate of iron	12 grains.
Acetate of soda	6 "
Beaufoy's acetic acid	1½ drachms.
Water	6 "

PREPARATION OF PURE PROTOSULPHATE OF IRON.—*W. S. B.* Boil dilute sulphuric acid and iron together until the acid is saturated; boil the liquid with iron filings in a narrow-necked flask till the crystallising point is attained, and strain through a filter moistened with water, into a vessel rinsed out with a little dilute sulphuric acid. The sulphuric acid prevents the filtrate from becoming turbid. The funnel must have a very long neck, reaching to the bottom of the vessel. The crystals, as they form, are left to drain upon a funnel, then rolled backwards and forwards between bibulous paper till they no longer wet it, and dried upon paper at a temperature not exceeding 30°. When well dried, they remain permanent for a long time in dry air, and for a tolerably long time in damp air.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. E. N.—We are sorry you stated that your letter was not intended for publication, as there was much interesting and valuable matter in it. May we make some selections and insert them in the "PHOTOGRAPHIC NEWS?" We think that if the question you raised in the former part of your letter was fairly discussed, it would prove of great interest.

A. B.—Perhaps gum benzoin dissolved in benzol, would answer the purpose of varnishing glass positives, so as to make the powder colours bite properly.

F. W. E.—Thanks for the information. We will look more carefully at your pictures.

T. BARRETT.—We are obliged for the suggestion as to the black varnish. Other correspondents, you will see, have however suggested plans which will answer all the purposes desired.

P. LOUIS.—1. The blank front is for an extra lens. 2. We will see if we can give a description of it. 3. A twin lens camera.

A. E. X.—The thickness of the glass must be allowed for either in focussing or some other way. In working with the calotype in the open air, it is customary to take several camera backs, each containing two sheets of sensitive paper; in default of these, the papers can be changed in a dark bag thrown over the head and shoulders, or by candlelight in any dark corner of a cellar or out-house. We have always met with the greatest civility at farm-houses when we have asked for the requisite accommodation, - in many instances refreshment being courteously offered us.

W. C.—We cannot endorse your opinions that the redeveloping solution in the alabastrine process necessarily destroys the half tones of the picture, and causes it to tarnish in a few months.

NEVA.—Some of our best pictures have been taken in the open air, in the shadow of a wall or tree.

J. F. L.—We cannot help you more than by recommending you to advertise for the kind of situation you want.

W. H. W.—We cannot imagine the cause of the discoloration you speak of; does it not disappear in the fixing bath? Many thanks for the information in your note; we will avail ourselves of it. We shall be very pleased to see the views you promise to send.

H. N. T.—The picture is a very bad one, and looks as if it had been sensitised in an alkaline bath. Add acetic acid to the nitrate bath.

PYROGALLIC ACID.—Use an old collodion and the following developing solution · Pyrogallic acid, 3 grains; glacial acetic acid, 1 drachm; alcohol, 1 drachm; water, 1 ounce; and fix with hyposulphite of soda. We shall be very pleased to receive an account of your exhibition. Please forward it at your earliest convenience.

T. SMITH.—The fault you mention is a very common one, and requires great skill to overcome. Try exposing for a little longer time.

A. B. C.—We think it will do, but you had better try it, as it is so simple.

F. J.—1. The cause of the mark on your collodion plate, the shape of the pneumatic holder, is owing to the unequal evaporation of the ether, the part over the holder evaporating in a different ratio from the rest. 2. Common water may be used as you propose, but there is a little liability to stains. 3. Gum arabic has been proposed as a varnish for collodion pictures, but the objection is, the injury done to it if wetted.

CAPTAIN, R.A.—We prefer a square camera. The direction of the longest side of the plate can always be managed by inner frames to the dark slide. We cannot recommend any place to buy glass. Most large houses would allow you to pick it out yourself, or would change scratched plates.

J. W. W.—Your plan of printing is as good as those in ordinary use, but not so good as the one given at p. 86. The colour of the inclosed print is bad, but the negative is good.

AN AMATEUR.—The process is not a good one. See answer to J. W. W.

T. S. SHEARD.—We have never tried the lenses you name, and so would not like to give an opinion. They are not, however, considered very good. A portrait combination will answer best for copying and enlarging.

H. DOUBLEDAY.—Received with thanks, but too late for examination.

F. H. W.—You received *lunar caustic* instead of proper fused nitrate of silver. Evaporate it down to half its bulk, and use it for printing.

P. Q.—We cannot help you further than by recommending you to obtain catalogues of powder colours from all who advertise, and purchase from those which contain the proper tints. Each maker gives the tints a different name and number.

CLERICUS.—We intend to complete the first volume of the "PHOTOGRAPHIC NEWS" in 26 numbers; it will have a full index. We will think over your other suggestions. Will you, in the mean time, assist us with your experience in the different processes?

J. H.—If the spot be merely an opaque substance in the glass, or an air bubble, it will not hurt; but, if there be veins in the glass, they might interfere seriously with the definition.

N.—We suspect your bath is in fault; add acetic acid to it. Try the plate cleaning solution, described at p. 156.

D. F. L.—1. The lenses must be parallel. 2. We do not quite understand your query, but there would be no difficulty in getting what you want.

W. REID.—We know nothing more of the *light* but what is published in the "PHOTOGRAPHIC NEWS."

P. M.—1. We know of no likely cause for the spots you refer to. 2. Try gelatine paper or the "crystal medium," as advertised.

E. PEPPER.—Your solution for cleaning plates is pretty good; but inferior to the one given at p. 156.

W. WOODFORD.—Received with thanks. In our next.

Communications declined with thanks:—F. A.—A Printer.—Uranium.—H. A. P.—Pyroxyline.—H. G.—Camera Stand.—L. M. N.—X. Y. Z.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Difficulty.—A Subscriber.—A. Q.—Patience.—Old Phos. P. A. A.—S. E. R.—Ross.—H. T. F.—Galileo.—Δ.—Positive.

IN TYPE:—Viator.—T. B.—E. P.—C. A.—H. S. L.—An Amateur.—E. H.—W. D.—Eusebius.—C. R.—A. E. X.—H. C. R.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 21.—*January* 28, 1859.

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.*

ON the subject of composition, we have often expressed an opinion in these pages that it was scarcely applicable to photography: and up to the present time, we see no reason for changing our opinions;—on the contrary, we find that what we have so often said on the subject, is fully endorsed by many of the best art critics in the country. Composition, properly, is of that class which Rejlander introduced by his picture of the "Two Ways of Life," and which Robinson has subsequently so successfully followed.

In large pictures composed of several negatives, there is a great amount of tact and ingenuity required, which is not so necessary when the picture is taken at once. In the Exhibition this year there are very few large compositions: we find that there are new faces in the field, while the old champions of composition are barely represented. We may here state, that it is with great regret we learn that Mr. Robinson has been extremely ill during the last few months; and to this we may attribute the fact that he has nothing new in the present collection. As we have already noticed his productions at great length on previous occasions, we do not feel called upon to do more than merely name them here; the chief are—"Fading Away," "She never told her Love," and the "Red Riding Hood" series. It is rather surprising to find so few pictures here by Rejlander. His compositions are smaller and less ambitious than his "Two Ways of Life;" he is extremely happy in catching the peculiarities of low life, and is very successful in rendering them. But when we see low life in all its broad features, as it actually exists, we see how it differs from the clever conventionalities with which some good artists invest it in comic journals. As an instance of the undesirableness of representing things as they really are, we may mention his composition of one of the characters in the "Seven Ages of Man" (2), the subject illustrated is—"The Infant Mewling and Puking in the Nurse's Arms;" this selection is not at all happy. When this subject is treated by the artist and draughtsman, the grosser characteristics are toned down, while in the photographic composition we have merely the unpleasant picture of the child literally fulfilling the poet's description. While looking at this picture in the exhibition-room, we overheard a lady criticising it, and she seemed to embody in a few words a most expressive and a most emphatic criticism when she uttered—"What a disgusting picture!" Such, we conceive, would be the expression of many. The picture "Well?" (154) is that of an old pedagogue listening to the scholar as he stumbles over his imperfectly-learned lesson. The expression of the old man as he mends his quill, listening to the broken utterances of the boy, is inimitable, while the unhappy look of the pupil is admirable. The "Scripture Reader" (183) is perhaps a more interesting subject than any of the others: the idea is thoroughly English, and will, we fancy, appeal to the feelings of many; though in carrying out the conception, there has not been a sufficient unanimity on the part of the models to enable the artist to do justice to his idea. The old man scarcely represents the character of a listener, while the old woman appears too intent upon her spinning. As to the arrangement of the interior, it bears all the marks of Rejlander's ingenuity, and the play of the lights and shadows is admirably given. Should any amount of success ever be attained in this department of the photographic art—we scarcely think it ever will—we must look upon Rejlander as the first who gave an impetus to it.

Of all the perpetrations we have ever seen in composition, we think we must give Truefit Brothers credit for having executed some of the worst. They are very bad photographs, and as compositions—if such a term can be applied to them—they are really ridiculous. These artists have attempted by means of photography to give us some pictures of country life. This, as all our readers know, is a class of subjects which finds great favour, both with artists and the public generally. But the pictures by Truefit Brothers have neither sentiment nor form in them; indeed, there is an absolute absence of that naïve simplicity which is the charming characteristic of pictures of rural life. The reason of this is plain, and it is one of the strongest arguments against composition in photography. There can be no doubt but that the models are genuine country children; but then, as photographic models, they are told to assume a class of sentiment which it is impossible for them to understand or appreciate, and which, as a matter of course, they fail to personate. To meet with anything like success, they should be subjected to many months' training ere they attempted to represent anything. "The Granny's Lesson" (10) is not the thing the title implies; it is simply an old woman sitting outside of a wooden shed, by the side of whom there is seated a child with its arms stiffly placed on the "granny's" knee, and with an expression of face that rather portrays a consciousness of having his likeness taken, than that which the piece is intended to illustrate. "A Shady Bank" (14) is similar in character and treatment to the other; a more correct title, however, would have been "A Hazy Photograph." Maudlin stupidity reaches its climax in the "Queen of the May" (23), "The Rivals" (29), "The Rejected" (35). As to the "Queen of the May," we cannot say much for the ideal attempted by this simpering representative of majesty. As to "The Rivals" and "The Rejected," the idea is simply absurd, and the *poses* and arrangement of the figures are more like bad stage conceptions, than scenes from actual country life. And so we might go on *seriatim*, without meeting with one good feature in any of the series by these artists. However, we will only notice two more: "The Young Fisher Boys" (191), "The Village Pump" (200). Until we obtained a catalogue, we could not conceive what the picture, "Young Fisher Boys," was intended to represent. From the peculiar angle at which the legs of one of the boys were placed, we concluded that it was a scarecrow attached to a pole for the purpose of frightening away birds, but the representation of something very unlike water corrected this. At last, puzzled with conjectures, we were forced to consult the catalogue, and found that the title was as we have described. "The Village Pump" is so badly printed, and so ill-arranged, that we will not waste time in noticing it. Our object in mentioning them at all, is to show the necessity for having real artists to conceive and work out the arrangements of compositive pictures. It cannot fail to strike the reader that the titles selected are such as would at once attract the attention of the curious; and, in the hands of such artists as Rejlander or Robinson, the subjects might have been adequately represented: from the foregoing remarks, we need hardly inform our readers, that Truefit Brothers have failed to do this.

Then Fenton has been tempted into this department, and,

* Continued from page 231.

for a "first appearance," his pictures are not so bad, still they are not such as please us. With regard to the arrangement of dress and interior detail, there can be no doubt that Fenton is the one who ought to be well able to give us a correct idea of the household economy of the Orientals. Still there is one thing which does much to spoil the whole of these studies, and that is what we have repeatedly urged on those photographers who attempt to illustrate eastern manners and customs, viz.: the necessity of having real national types as models. If these compositions are to be of any use, let us at least have associated with the dress the physical characteristics of the nation; and let the physiologist have equal chance with the *costumier*. In the very clever photographs of Turkish character, which W. M. Grundy exhibited some time ago, the very same defects were apparent that are to be seen in Fenton's pictures. In these pictures, Fenton has not succeeded in overcoming the difficulty of copying from expressionless models,—a difficulty to which we have often alluded in connection with this subject. A most amusing circumstance, in connection with his picture of the "Pasha and Bayadere" (46), is the fact that one of the "tricks" which enables the composer to produce an effect is too palpable. It is, indeed, "A Peep Behind the Scenes." If the visitor will very closely inspect this picture, he will find that the strings, which are intended to hold up the hands of the female figure, are plainly to be seen. This is a peculiar defect in many of Fenton's compositions: the figures have not been able to keep their hands quite still while the picture was being taken. In the picture "Returning from the Fountain" (59), everything has been sacrificed, as far as background effect goes, in order to catch the figure. This is to be regretted, as it spoils the picture. "Nubian Water Carrier" (608) is the best of these series, the only defect is a little mistiness about the hands; altogether, we may congratulate Mr. Fenton on his first attempts.

(*To be continued.*)

ON THE CAMERA OBSCURA.*

BY PROFESSOR PETZVAL, OF VIENNA.

THE advantage of a diaphragm before the lens is, that it can be placed so as to admit only those rays of a cylinder whose intersections correspond to that part of the caustic which is situated in the plane of the picture. In order to convert a telescopic lens into a tolerably good camera lens, the cylinder of rays which corresponds to an image near the edge of the field must be treated in the manner described, and the position of the diaphragm determined accordingly. With a lens 3 inches in aperture, and a focal length of 16 inches, such as was in general use in the early period of daguerreotyping, the diaphragm is best placed at a distance of 3 inches before the lens, its aperture being 1 inch. The image thus obtained, although tolerably good, will not be of uniform sharpness; in the centre it will perhaps bear magnifying three times, whilst at the edges it will barely admit of examination with the naked eye. In point of sharpness, therefore, this picture is at least three times inferior to one of the cameras already used as a term of comparison. With respect to illumination, the superiority of the ordinary modern camera is still greater, for since the degrees of illumination are directly proportional to the squares of the apertures, and inversely proportional to the squares of the focal lengths; the ratio in question is 1 : 19 nearly. It must be noted, however, that the modern camera has four more reflecting surfaces than the old one; by which means almost one-fifth of the light is lost, and the above ratio diminished to about 1 : 16.

The substitution of an achromatic in place of an un-achromatic object-glass is, beyond comparison, the most important step in the improvement of the camera; for not only have the properties of sharpness and illumination been thereby increased—the former in the ratio of 1 : 7, and the latter even in the ratio of 1 : 40—but the serious defect of separated optical and chemical foci has been remedied. Besides this, the image has become nearly plane, a result which, it is true, might also have been obtained in the case of an un-achromatic lens by means of the same method of blinding. Lastly, the field has become almost universally lighted; the not very broad zone of diminishing intensity of light which still exists, is due to the blinding. As diaphragms often produce this defect, it will be well to examine their action more closely.

Around the centre of the lens, and with a radius of 1 inch, conceive a circle to be described: its circumference will be at the distance of half-an-inch from that of the lens. The diaphragm at the distance of 3 inches having an aperture of 1 inch, all cylinders of rays passing through the same will be entirely received by the lens, provided their axes are within or upon the circumference of the above circle, and the corresponding images will possess the maximum intensity of light. The rays of every cylinder whose axis meets the lens in the circumference of the circle, are inclined to the axis of the instrument at an angle of 18°; consequently, everywhere within a field of 36°, the image possesses full intensity of light. Again, only one half the rays of those cylinders whose axes exactly graze the edge of the lens will be admitted by the latter, the entrance of the rest being prevented by the brass mounting. These rays are inclined at an angle of 26° to the axis of the instrument, so that between 36° and 52° the intensity of light in the field will diminish from its maximum value to one-half of the same. Lastly, the lens will admit none of the rays of the cylinders whose axes meet its plane at a distance of half-an-inch from its edge; consequently, between 52° and 66° the intensity of light diminishes from half its normal value down to zero. Thus when uniform light is required, the field must not exceed 36°; in other words, the focal length being 16 inches, the diameter of the circular picture cannot exceed 10 inches.

Such are the properties of the instrument with which Daguerre worked when he made his beautiful discovery. At that time silver plates coated with iodine were alone employed; and the time of exposure required was so great—half-an-hour, that portrait-taking was next to impossible. Hence arose the demand for a camera-lens producing greater illumination, and equal, or, if possible, greater sharpness. Sooner or later practical opticians would, no doubt, have sought to improve the camera of Daguerre by substituting a convex-concave in place of the plano-convex achromatic lens; for the former, treated in the manner above described, possesses several advantages. Science, however, stepped in with more efficient means, and Professor Petzval, after a thorough theoretical investigation of the subject, set about constructing his first object-glass, destined principally for portrait-taking.

In so doing he was guided by the following considerations:—The object-lens of a telescope has only three conditions to fulfil: *first*, to possess a given focal length; *second*, to be achromatic; and, *third*, to reduce the spherical aberration to a minimum.

In the camera, however, the number of the conditions is raised from three to eight, five of which have reference to a much more complete destruction of spherical aberration, two to the production of achromatism, and the eighth to the position of the focus. Instead of three, therefore, eight optical elements are requisite, the choice of which will be determined by the following considerations:—Greater illumination, one of the desired improvements, can only be obtained in two ways—by enlarging the aperture, and by diminishing the focal length, both of which, however, will result from employing two converging lenses instead of one. These lenses must of course be achromatic, and, by theory, in order that a good image may be produced, they must be separated from each other by a distance of not less than one-third of the focal length of the lens next the object. In order to form the eight requisite elements, therefore, seven

* Continued from p. 230.

lens surfaces and one distance may be selected. By this selection the first lens need but present three surfaces to be disposed of, so that its constituents may have a common surface. The second lens, however, in order to furnish the remaining four surfaces, must have its constituents separated, even though by so doing light is lost.

In accordance with these data, Professor Petzval calculated a new object-lens which had an aperture of 1¼ inch, and a focal length of 5½ inches. With it portraits were taken in forty seconds; in point of illumination it was sixteen times superior to the camera of Daguerre, and its images were sharp enough to bear magnifying twenty times. The principal defects of the new camera were a curved image, and limited field of view, both of which resulted from the employment of separate lenses.

With respect to the first defect, the image of a plane object was, according to theory, situated in the hollow of a paraboloid of rotation, having its vertex a radius of curvature equal to 7 or 8 inches. In object-glasses afterwards constructed, where the aperture was increased to 3 inches, this curvature was softened to 15 inches. By sacrificing a little sharpness at the edges, too, circumstances generally furnished means of softening this curvature still more.

The second action of the separated lenses deserves closer examination. It will be at once seen that here the setting of the first lens plays the part of the former diaphragm, and modifies the admission of light to the second lens. As an example, let us take an object-glass whose two lenses are 5¼ inches apart, the aperture of each being 3 inches. Let the focal length of the first lens be 16 inches, and that of the second 24 inches. Then, by means of the first lens, a cylinder of rays parallel to the axis becomes converted into a cone, whose vertex is 16 inches behind this lens; and the plane of the second lens intercepts this cone in a circle whose diameter is diminished to 2 inches; the same is true approximately for every other cylinder inclined to the axis of the instrument. Around the centre of the second lens, therefore, let us conceive a circle of ½-inch radius described; its circumference will be at a distance of 1 inch from that of the lens, and it is clear that the second lens will admit all the rays of every cylinder whose inclination to the axis of the instrument is such, that the axial ray of that cylinder, after passing unrefracted through the first lens, meets the second in the circumference of the above circle. The image produced by such a cylinder, therefore, will possess the same maximum of illumination as do the central images. But the entrance of the rays of other cylinders more inclined to the axis of the instrument will be more or less impeded; and, by following the method already explained in the case of Daguerre's camera, it will be found that throughout a field of 10¾° there will be maximum light; that between this and a field of 32° the intensity of light will diminish to half its normal value; and, lastly, that the whole extent of the field, beyond which is darkness, amounts to about 50°. These angles correspond on the pictures to circles whose diameters are 2, 6, and 10 inches respectively.

When portraits only are to be taken, that is to say, when a correct picture of only a small portion of the object is desired, this unequal distribution of light is of no great importance. In the case of landscapes, maps, engravings, &c., however, it forms a serious defect, and necessitates the use of diaphragms, not only to distribute the light more uniformly, but also to diminish the influence of unequal distances of objects, and to soften the curvature of the image. The best place for the diaphragm is exactly midway between the two lenses, and by diminishing the intensity of light to ¼th, ⅛th, or to $\frac{1}{16}$th of its full value, the field of equal illumination may be increased to 31°, whilst the two zones, wherein the light first diminishes to half its normal value and then to zero, may be made much narrower.

The modifications applied to the old instrument to fit it for its new purposes, had for their object, principally, to increase the magnitude of the field and the uniformity of its illumination, and consisted in a diminution of the distances between the two lenses, and of the aperture of the second. The object-glass, constructed carefully with a view of fulfilling all the new conditions, and submitted to the Academy of Vienna, consists as before of two lenses; the first has an aperture of 3 inches, and the second of 2 inches, the clear distance between the two being 1 inch. The magnitude of the picture is the same as that corresponding to a single achromatic lens of 26 inches, focal length, its diameter being 20 inches; in other words, the field amounts to 42°, and is uniformly lighted. This last result is due to the diminished aperture of the second lens, and has been purchased, of course, at the expense of intensity of light. The curvature of the image of a plane object is small, its radius at the vertex being about 80 inches.

With respect to the achromatism of the two lenses, it is well known that the ratio between the indices of refraction for crown and flint glass is not constant, but varies with the colour of the ray, and that, on this account, the rays of all colours cannot be made to coincide simultaneously by any arrangement of the two kinds of glass; in other words, according to the technical expression, a certain chromatic aberration of the secondary spectrum always remains. In the telescope, most attention is paid to the coincidence of the rays at the red end of the spectrum, and without injury to the picture a considerable aberration of the rays at the violet end may exist. These rays, however, exert the greatest chemical action, whence it happens that the object lens of a telescope gives a less sharp photographic, than optical, image. On the other hand, if the opposite end of the spectrum were most attended to, the photographic picture would be improved at the expense of the optical one, and in both cases the chemical and optical foci would be separated. In constructing the new object-glass, the whole spectrum, rather than either end of it, was regarded, and the most active chemical made to coincide approximately with the most active optical rays, so that, for a healthy eye, the chemical and optical foci coincide.

From the above exposition, it follows that, whilst the new camera is inferior to the old in point of illumination, it far surpasses the latter in magnitude of the field, and in uniformity of sharpness, as well as of illumination. Whilst the new camera, therefore, is best adapted for landscapes, the old one may still be used whenever a brief period of exposure is desirable, as in taking portraits, or pictures of living animals.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

Of the Influence of the Strength of the Bath—(*continued*).—Let us now endeavour to ascertain to which of the two elements present this rapid impoverishment is owing.

If a sheet of paper be taken without any preparation, and submitted to the nitrate of silver, and afterwards washed repeatedly in distilled water, and, finally, exposed to the full glare of the sun, it presents only a feeble colouring; and as the silver bath is not altered in any appreciable manner, we may conclude that the paper itself is without influence, and that it takes from the bath only the quantity of silver proportionate to the quantity of liquid it absorbs.

It is not the same with the albumen. Let us take a sheet prepared with this substance, pure, without addition of soluble chloride, submit it to the nitrate of silver bath, then, having washed it several times in distilled water, expose it under a negative, and we shall see it produce a very clear and vigorous proof. If we test the strength of the bath before and after the passage of the sheet of paper, we shall find that the 100 cubic centimètres of water which previously contained 15 per cent. of silver, no longer contain the same proportion. We find that the quantity of liquid

* Continued from p. 221.

absorbed has been 8 cubic centimètres, which ought to have weakened the bath to the extent only of 1·20 gramme of nitrate, whereas, in fact, the albumen has taken up 2·65 grammes; consequently, the richness of the bath is reduced to 13·9 per cent. This fact also, which is an important one, will receive further consideration when we treat of the theory of insolation. But our analyses prove beyond doubt that the albumen deprives the bath of a large quantity of nitrate with which it combines.

Gelatine and starch do not lead us to similar results; it is well known that neither the one nor the other gives with the nitrate of silver an insoluble combination, and if both influence, as we have no doubt they do, the value and colouring of the proof, it is by combinations which form eventually, or under the luminous influence, and which, in any case, never affect the proportions of the nitrate bath.

We have now to examine the part played by the chloride from the point of view under consideration. Experiments made on paper salted in a solution at 5 per cent., without additional sizing, and manipulated in the manner described above, give this result:—that a sheet of paper 44 × 57 placed in contact with a bath measuring 180 cubic centimètres, and showing a richness of 12·82 per cent., robbed the bath of 3·10 grammes of silver, together with 10 cubic centimètres of liquid (the paper, not being albumenised, was more porous, and absorbed a greater quantity of liquid). These 10 cubic centimètres correspond to 1·28 gramme of nitrate of silver, therefore 3·10 − 1·28 = 1·82 gramme have been absorbed by the paper in the condition of chloride. The difference here, as is evident, is much less than when the paper is both salted and albumenised; it is, to all appearance, equal, and rather superior to that which the albumen alone produces.

Thus, then, the chloride and the albumen concur in the impoverishment of the bath in consequence of the formation of two insoluble combinations, and the porosity of the paper accelerates its diminution. One may say in general terms, that a sheet simply salted impoverishes the bath to a certain extent, and that a sheet both salted and albumenised impoverishes it to twice that extent. The first two causes alone need occupy the photographer, because they change the richness of the bath, and, by consequence, the results; and since, as we said at the beginning, the rule of this impoverishment cannot be stated in an absolute manner, but merely the method according to which it operates, we cannot too strongly impress on photographers the advisability of adopting this method of testing their baths, which alone can save them from the causes of error we have particularised.

Of the Time of Contact with the Silver Bath.—We have inquired what influence the length of time during which the paper is floated on the silver bath can have on the bath. The paper imbibing a greater or less quantity according to the time of contact, it appeared *à priori* evident that the absorption of free nitrate of silver would be greater as the time of contact was prolonged, and this has been confirmed by experiment.

A contact of one minute does not suffice: in this period the whole of the soluble chloride can scarcely be converted into chloride of silver; hence, relative insensibility, streakiness, and spots in the designs. Five minutes give a very good result; fifteen furnish a proof verging a little more on black than the preceding. We thus return to the preceding example; and it is established that a more prolonged sojourn in the bath corresponds to an augmentation of richness in the paper, and, consequently, to an augmentation of clearness in the proof—within a certain limit, of course. Five minutes may be considered the normal time; and if, to modify the proofs furnished by a negative, the operator desires to alter the richness of the proof by a stay of greater or less length in the bath rather than by using baths of variable richness, this should be considered the fixed period around which to oscillate.

(*To be continued.*)

ON CASEINE FOR PHOTOGRAPHIC PURPOSES.

La Lumière contains the following on the subject of a process discovered by M. Duchochois, (and given at p. 183 of the "Photographic News,") for substituting caseine for albumen in the preparation of negatives, after the Taupenot method.

Caseine being unknown to a great many photographers, we will briefly make them acquainted with its properties, and teach them a very economical method of preparing and preserving it.

Caseine constitutes the azotized part of the milk of mammiferous animals, in which it is held in solution by a small quantity of potash. Cheese is almost entirely composed of it.

Although M. Duchochois has given instructions for preparing soluble caseine, we are bound to declare that *soluble caseine does not exist.* Caseine does not dissolve in water. For this to take place it must be accompanied by an alkali. In that case it is no longer caseine that is held in solution, but a *caseate.*

In his method of preparation he directs the precipitation of skimmed milk by means of sulphuric acid. Any other acid will give the same result—we may mention more especially hydrochloric acid and acetic acid, which every photographer possesses in his laboratory.

After having washed the precipitate on a filter, first with acidulated water, and secondly with pure water, we advise its solution in a little carbonate of soda or common salt, substances much better known than carbonate of barytes, and which may be easily and cheaply procured anywhere. Sal ammoniac may be employed just as efficaciously, and also nitrate of potassa and iodide of potassium, bodies with which photographers are already familiar.

After filtering, the solution must be evaporated. This solution on contact with the air gradually becomes covered with a pellicle, insoluble in both acids and alkalies, and in the salts just mentioned. It is this pellicle which is formed on milk when heated. When all the liquid has evaporated, the caseine presents itself under the form of an amber-coloured amorphous mass, without smell, and of an insipid taste. Its solution is coagulated by alcohol and acids. All the earthy and metallic salts precipitate it. With chalk, or better still with lime, it gives an insoluble compound, which is employed in painting in distemper, as well as for preparing a mastic susceptible of receiving every species of painting and impression.

It is under the form of caseate of lime that caseine can be best preserved, and we cannot too earnestly call the attention of photographers to this fact. When it is desired to disengage the caseine required for use, it suffices to digest some bits of the caseate of lime in hydrochloric acid or vinegar. The operation must be conducted in such a manner that a little of the salt shall remain undissolved. The liquid must be filtered, and the precipitate washed with care, and applied to the purpose for which it is intended at once—as otherwise it will very likely happen that the whole of the caseine prepared will be lost; for this substance easily putrifies, and becomes transformed into a variety of products, with the liberation of an insupportable odour.

The following method gives caseate of lime most abundantly and economically. Take white cheese and heat it with a solution of carbonate of soda, in such a way that after a contact of several hours there shall be a little cheese in excess. Filter it, and pour into this liquid a solution of lime, obtained by the immersion in water of a small quantity of slaked lime. An abundant white precipitate composed almost entirely of caseate of lime will be obtained. This precipitate is laid on a cloth, and washed with abundance of water, and left in the air to dry. When dry, it is preserved for use as required.

The composition of caseine is the same as albumen. In 100 parts by weight, it contains, according to Dumas and Calwin:

Carbon	53·50
Hydrogen	7·05
Nitrogen	15·77
Oxygen	23·68

EXHIBITION OF THE FRENCH PHOTOGRAPHIC SOCIETY.

THE French Photographic Society organises its third exhibition, in a special department of the Palace of Industry, of photographs and works connected with photography in any of its branches. It invites both native and foreign photographers to send pictures, under the following conditions:—

1. The opening of the Exhibition will take place at the Palace of Industry on the 1st April; and it will be closed on the 15th June following.
2. Pictures for exhibition must be delivered, with all charges paid, to M. Martin Laulerie, rue Drouot 11, between the 1st and the 15th March.
3. The exhibitor should send a note at the same time, stating the number of objects sent.
4. Exhibitors must protect their pictures by means of frames or passe-partouts.
5. All coloured proofs will be excluded, as well as those which give evidence of having been "touched" in such a way as to modify the photograph properly so called, by manual operations.
6. Exhibitors are requested to append their name and address to their work.
7. The mention of the nature of the negative process employed, whether it be dry or wet collodion, albumen, &c. &c., is obligatory; and any additional information will be received with pleasure.
8. Nobody will be allowed to fix the price at which he would sell his work, but he may communicate it to the secretary, who will hold such information at the service of the public.
9. No picture can be removed until the closing of the Exhibition.
10. The jury appointed for the purpose will decide what pictures shall be admitted to the Exhibition.
11. Pictures must be removed within a week after the closing of the Exhibition.

Critical Notices.

The A B C of Photography. Tenth edition, with additions, including recent improvements in the Art. London Stereoscopic Company.

WHEN we wish to express our ideas of simplicity, the most usual way of saying it is—"Oh! it is as plain as A B C." The work is quite in accordance with the title, as it is in reality an A B C of our art. In the introduction, the author, in the most patronising manner, informs us that he "will not rake up his Greek." Fortunately he does not, as he thereby spares us a great infliction. The account which the author gives of the system of photography is clear and understandable. The hints on the Positive process contained in the opening chapters, entitled, "Preparatory Arrangements," "Coating the Plate," "Making the Plate Sensitive," "Exposure of the Plate," and "Developing the Plate," are such, that if the amateur only observes them he is almost certain to achieve a success. Should he, however, meet with failure, by consulting the chapter of causes and effects, entitled, "Failure with Glass Positives," he will be almost sure to meet, in this summary, some of the laws which he has failed to observe. What we have said of the author's treatment of the positive process, is equally applicable to the other branches treated of. In fact, as a simple introduction to photography, this book, in the hands of a beginner, would be the "right book in the right place." It has one great advantage over many similar treatises, viz., that absence of pedantic technicalities, which are only understood by those deeply versed in chemical and optical science.

Stereograms of English Scenery. By W. WOODWARD, Nottingham.

THESE stereograms illustrate some of those charming little nooks and corners of rustic scenery with which this country abounds. In his selection of sites, Mr. Woodward has been exceedingly happy; and when he has attempted to photograph historically interesting places, he has evidently been guided with great artistic taste in giving the best view that could be obtained. The process by which they are obtained is the collodio-albumen; and, judging from those before us, we doubt not but that they are among the best specimens which have yet been obtained by it. The scene in "Burghley Park, Stamford," is a very fine picture; and the photographer has, in the most successful manner, given true effect to the water, while, at the same time, a great amount of definition has been obtained, not only in the background foliage, but also in the detail of the foreground. The most successful architectural slide is that of "Newstead Abbey." His lane scenes are very pretty, and would, we doubt not, be of great use to an artist as studies of rustic scenery. The great feature of the series is, equality of tone, and careful manner of treatment.

Lessons on Colouring Photographs.

COLOURING POSITIVES ON GLASS—(*continued*).

Chromo-Photographs.—This term has been used to designate a class of pictures in which the colours are made so to permeate the collodion film that, when viewed from the opposite, or glass side, the tints are sufficiently brilliant, presenting a non-inverted coloured picture. In using this designation to describe these pictures, we must not be understood in any way to indorse the appellation, which is inappropriate and misleading. We refer to it, because we believe the term and the process have excited some interest amongst our readers. To describe the method of producing this result, we cannot do better than quote a paragraph from a valuable work just published,* and then add some observations of our own.

"The mode of producing this result is simple, and when well done presents somewhat the effect of enamelling on glass. It depends, in the first instance, however, on the collodion film being permeable; this is sometimes the case in ordinary positives taken with a collodion, the pyroxyline of which has been made at a high temperature, thus giving a powdery film. This permeable film, however, is best obtained by the 'Alabastrine Process;' and the best specimens we have seen of the non-inverted coloured positives have been produced by it. The picture having been varnished and coloured—and, if necessary, varnished and coloured again (a little extra care being used to obtain brilliancy in the carnations)—is to be varnished once more with a 'penetrating varnish,' provided for the purpose, which has the effect of projecting the colour thoroughly into the collodion film; the result is, that the positive then viewed from the glass side presents a picture as vividly coloured as on the collodion side."

In attempting to apply this process to ordinary collodion positives, certain conditions must be remembered. Photographers are aware that, amongst the various classes of glass positives—all good enough of their kind—there are two possessing very distinctive features. The first is in many respects somewhat allied to a negative in character; its intensity is obtained by a thick deposit of reduced silver in the lights. In the second, intensity in the lights is obtained by purity of colour in the reduced silver; the deposit is thin, but of a pure white. A picture of the latter class—the collodion being also powdery or porous in texture—is best suited for permeating with colour so as to produce a non-inverted picture. As is stated, however, in the above extract, by far the finest results are produced by applying the process to alabastrine photographs. The colouring is proceeded with as we have described in former chapters, with powder colours; remembering throughout, however, that the tint of the colours used will be somewhat modified by the final coating of "penetrating varnish." The nature and extent of this modification can only be learnt by expe-

* "The Principles and Practice of Harmonious Colouring, especially as applied to Photographs." Published at the "PHOTOGRAPHIC NEWS OFFICE," and by Newman, Soho-square.

rience—in some colours the modification being in depth, and in others in tone. Some of our correspondents have recommended the use of turpentine as a varnish for producing these pictures. We would, however, caution our readers against its use; for, in addition to producing very imperfect results, it is sure, eventually, to spoil their pictures, by becoming discoloured and yellow. These pictures should always be taken on colourless glass, and should be backed with velvet.

This method of colouring is peculiarly adapted to uniforms, in which it is important that the various ornaments should not be inverted as regards right and left. We have found it possible to obtain a very perfect scarlet coat by using this method on an alabastrine photograph.

COLOURING PAPER PHOTOGRAPHS WITH POWDER COLOURS.

Paper photographs are most frequently coloured in water or oil colours, and of the method to be pursued we shall speak in the proper place. Very fine results, however, may be produced by the skilful colorist through the use of powder colours, and with this advantage over the other methods we have named—that the picture retains all its photographic characteristics; it remains a tinted photograph: whilst in using water or oil colours it often happens, that the photograph becomes merely the basis on which to paint a picture—more or less of the photograph being obliterated at every stroke of the brush. The use of powder colours, however, renders imperative the possession of a photograph perfect in all respects to work on, as little or nothing can be added with the pencil, except colour, to the already existing light and shadow.

Albumenised paper prints are most commonly used for this purpose, although plain paper may be used if the surface be treated with a sizing preparation to which the colours will adhere. The picture should be mounted on cardboard, and, if possible, passed between steel rollers or hot pressed. The colours are then applied in the same way as in colouring glass positives; we must, however, be careful to apply the tints of the required depth at once.

If the photograph be not quite so perfect as we have stated it should be—that is, if it possess some black shadows quite destitute of detail and drawing—there is even here a succedaneum to which the colorist may resort. With the point of a knife the surface of these black shadows may be slightly abraded, in such a manner as the drawing may require. To these half-lights, thus "taken out," the proper dry colour is then to be applied; it will be found to adhere perfectly. Instead of "taking out" lights in this way, they are sometimes carefully stippled on with body colour, and the dry colour then applied over it. These methods are more applicable to landscapes than to portraits.

(To be continued.)

Photographic Chemistry.

CHEMICAL MANIPULATIONS—*(continued)*.

Decantation.—When the precipitate is very heavy, and lies closely at the bottom of the vessel, the method of washing employed is decantation; this is the mode in which the chloride or iodide of silver is washed: all that is necessary to accomplish this is to pour off, or decant, the liquid, and then to pour on fresh, repeating the operation as often as may be necessary. After pouring on each quantity of water it should be well stirred with a glass rod; and, the substance being washed, allowed to settle thoroughly before any attempt be made to decant the liquid. The operation may be repeated eight or ten times.

To perform this purification of insoluble substances properly, distilled water should be used; but, generally speaking, filtered water will answer the purpose, provided that the last two or three washings are made with distilled water. One thing to bear in mind in this process is, that it is advisable not to be in a hurry.

Analogous to this mode of washing substances, is that employed in obtaining powders of great and uniform smoothness, termed *levigation*. A fine powder, say the tripoli powder used in cleaning glass plates, for example, is placed in an upright glass vessel, which is filled up with water and violently agitated; it is then placed on a table, when the heavier particles fall to the bottom, leaving the finer portions in suspension. The upper portion of the liquid containing the latter is poured off into a filter; and it is manifest that this powder will be free from coarse particles which would scratch the plate.

Evaporation.—The object of this operation is to separate a solid body from its solvent,—that is, when the latter can be driven off in a state of vapour. The evaporation is said to be spontaneous when the liquid disappears of its own accord: we may illustrate this by taking a drop of a salt solution and letting it fall on a smooth surface; the liquid will gradually evaporate, and the salt will be restored to its original condition. Evaporation may be assisted by the liquid being placed in a vacuum; or, as in the ordinary method, by heating the solution to boiling point. When there is no object in collecting these vapours, the operation is performed in an open vessel; but when it is desired to preserve them, it is conducted in a perfectly air-tight vessel, fitted with a long neck, which passes into the neck of a similarly shaped vessel: the operation is then termed—

Distillation.—The object being to separate a volatile body from a solid, or a volatile body from one less volatile, and at the same time to preserve both. The bodies to be separated are placed in one of the vessels and maintained in a state of ebullition; the vapour generated, having no other outlet, passes along the neck of the vessel into the second retort, which is kept cold by immersion in water or ice, according to the nature of the substance undergoing distillation, and condensation occurs, the vapour trickling down the sides of the vessel in the form of a liquid.

Concentration.—A solution is said to be concentrated when a part of the solvent is evaporated, and the proportion of the body dissolved to that of the solvent is thus rendered greater: when a fresh quantity of solvent is added, the solution is said to be *diluted*.

Sublimation.—This operation is analogous to that of distillation, but is applied to bodies that pass at once from the condition of vapour to that of a solid; such as iodine, and sal ammoniac. These bodies are heated in an air-tight vessel, and the portion vaporised or sublimated rises to the upper part of the vessel, and is condensed therein.

Heating.—The mode of heating is almost a matter of indifference; it may be accomplished either by means of the spirit lamp, charcoal, or gas; the rule to be observed in its application only requiring that it shall be gradual, otherwise the fracture of the vessel containing the substance, and the loss of the substance itself, will be probable consequences. The thinness, which should be the same throughout, is a matter of special importance in the choice of a glass vessel for these manipulations; and the heat should be so applied that it shall not act on any part of the vessel except that which is covered by the liquid; this is easily managed by placing a tile above the fire with a hole perforated in the centre, in which the flask is placed.

Fusion.—What we understand by fusion is, the passage of a solid body from the condition of a solid to that of a liquid by the application of heat; as in the case of lead, silver, &c. A distinction must be drawn between *aqueous* fusion and *igneous* fusion: aqueous fusion is the dissolution of a solid in its water of crystallisation, igneous fusion is its liquefaction after the water has left it; for example, crystallised carbonate of soda, exposed to heat, first undergoes aqueous fusion, then it loses its water of crystallisation and becomes solid again, and by the application of a more intense heat it is made to undergo igneous fusion.

(To be continued.)

Dictionary of Photography.

ARGENTOMETER.—An apparatus by which the quantity of silver present in any solution can be tested. The simplest method of effecting this is the following:—

Prepare a solution of 32 grains of pure chloride of ammonium in 12 ounces of water; 1 drachm of this solution will, therefore, precipitate 1 grain of nitrate of silver. Measure out very carefully a known quantity of the bath to be tested (2 drachms for instance), place it in a 2-ounce phial, and add a few drops of nitric acid. Now measure out exactly 1 drachm of the solution of chloride of ammonium, and add it, by a few drops at a time, to the silver solution in the bottle, corking it up and shaking violently between each addition, until a white precipitate is no longer produced on the addition of another drop of the test solution. If, before this is accomplished, the first drachm of test solution be exhausted, carefully measure out a second drachm, and so on until the desired point is attained. When finished, the number of drachms of test solution used will indicate the number of grains present *in the phial*. Thus, supposing 2 drachms of the nitrate bath had been placed in the phial, and it required 7½ drachms of test solution to precipitate the silver, that would have shown that the 2 drachms of bath contained 7½ grains of nitrate of silver, or 30 grains to the ounce.

ASPHALTUM.—A substance also known under the name of Jews' pitch, mineral pitch, or compact bitumen. It is found in abundance in several localities, especially near the Dead Sea, and the famous *pitch lake* in Trinidad. It resembles in appearance common pitch, sinks in water, melts easily, and is very inflammable, burning with a red smoky flame. Asphaltum is a body of great interest to the photographer, as it was one of the substances used by M. Nièpce in the early days of the art, for the purpose of preparing a coating sensitive to light. The process was called by the inventor Heliography, and is thus described in his own words:—I about half fill a wine glass with this pulverised bitumen. I pour upon it, drop by drop, the essential oil of lavender till the bitumen can absorb no more. I afterwards add as much more of the essential oil as will cause the whole to stand about three lines above the mixture, which is then covered, and submitted to a gentle heat until the essential oil is fully impregnated with the colouring matter of the bitumen. If this varnish is not of the required consistency, it is to be allowed to evaporate slowly, without heat, in a shallow dish, taking care to protect it from moisture, by which it is injured, and, at last, decomposed. A tablet of silver is to be highly polished, on which a thin coating of the varnish is to be applied cold, with a light roll of very soft skin; this will impart to it a pure vermilion colour, and cover it with a very thin and equal coating. The plate is then placed upon heated iron, which is wrapped round with several folds of paper, from which, by this method, all moisture has been previously expelled. When the varnish has ceased to simmer, the plate is withdrawn from the heat, and allowed to cool and dry in a gentle temperature, and protected from a damp atmosphere. The plate thus prepared may be immediately submitted to the action of light in the camera. But after exposure nothing is apparent to show that impressions exist. The forms of the future picture remain still invisible. The next operation, then, is to disengage the shrouded imagery, and this is accomplished by plunging the tablet into a solvent consisting of one part, by volume, of essential oil of lavender, and ten of oil of white petroleum, until the operator, observing it by reflected light, begins to perceive the images of the objects to which it has been exposed gradually unfolding their forms, and, though still veiled by the supernatant fluid, continually becoming darker from saturation with varnish. The plate is then to be lifted out, held in a vertical position until as much of the solvent as possible has been allowed to drop away, and then carefully washed under a stream of water. This process was very uncertain and tedious, as exposures of six or eight hours in the camera were required. Further experiments of MM. Nièpce and Daguerre soon modified and improved it, until, ultimately, the latter gentleman discovering the beautiful process which bears his name, the original Heliographic process of Nièpce was forgotten. Latterly the nephew of the original discoverer, M. Nièpce de St. Victor, has drawn public attention to this process on account of its applicability to the purposes of obtaining photographic etchings upon steel. The surface of the steel plate is first to be carefully cleansed with whitening and water, then very dilute hydrochloric acid is to be poured over, when the plate is to be immediately washed and dried. A mixture of asphalt with a small portion of pure wax, having been dissolved in equal parts of oil of lavender and benzol, is to be poured on the plate in a darkened chamber, which is then to be dried carefully. The prepared plate then, having been exposed to the light underneath a good positive photograph, is to be submitted to the action of a solvent consisting of three parts of naphtha and one of benzol: where the light has not acted, the varnish is dissolved by this mixture. After this solvent has proceeded far enough, the plate is washed off with water, and the exposed parts are bitten in with a mixture of 1 part nitric acid, 2 parts alcohol, and 8 parts water. The plate may then be printed from in printers' ink, in the ordinary manner.

A modification of this process has been applied to lithographic purposes; in this case the prepared varnish is poured upon the lithographic stone, a negative photograph is then to be placed upon it, and exposed to the light. After submitting the stone to the action of an appropriate solvent, it is washed, treated with a dilute acid, and again washed; after which it may be used for printing with ordinary lithographic ink, which attaches itself to the parts upon which the asphaltum is left.

These processes have now been superseded by others, in which Mr. Fox Talbot's discovery of the action of light upon "chrome-gelatine" is more or less appropriated by experimentalists, and published by them as the basis of a *new discovery*.

(To be continued.)

A Catechism of Photography.

FIXING THE IMAGE.

Q. What is the next process after the development of the image?

A. The plate must be thoroughly washed in order to relieve it from any particles of silver which may still remain upon the surface. After being thoroughly washed, the impression is "fixed."

Q. What solution is used in fixing a collodion picture?

A. For this purpose two dissolving agents are used, namely, hyposulphite of soda and cyanide of potassium.

Q. How is the hyposulphite of soda used?

A. A saturated solution of hyposulphite of soda being placed in a bath, the plate is immersed in it. The yellow tint of the iodide of silver gradually disappears, and the picture, in all its beauty and purity, is brought out. It must then be taken from the bath, and fresh water copiously poured over it; after this it must be allowed to dry.

Q. How is the cyanide of potassium employed?

A. A solution is made in the following proportion:—

Cyanide of potassium	2 parts.
Water	100 parts.

When applied to the surface of the collodion plate the action of the cyanide of potassium upon the iodide of silver is exceedingly rapid. As soon as ever the yellow tint is removed, which it will be in a few seconds, the plate must be instantly removed, and thoroughly washed—being placed in a bath of pure water, or else having fresh water poured upon its surface.

Q. What plan is adopted when the image on the plate is but feebly developed?

A. Instead of removing the iodide of silver, it is necessary to destroy its sensitive action. This is done by applying to the plate a solution of bromide of potassium, a solution of persulphate of iron, or a solution of common salt. Thoroughly washed with this solution, the plate is allowed to dry. Plates so preserved generally give impressions of great softness, but in procuring positives from them considerable time is necessary, as it is difficult for the light to penetrate the yellow coating of the iodide of silver.

VARNISHING THE PLATE.

Q. How would you describe the picture produced according to the foregoing rules?

A. As a *negative* collodion picture.

Q. Why should it be described as a *negative?*

A. Because it is intended for the purpose of reproducing other pictures; and consequently all its blacks and whites are reversed, so that, in the impression taken from it, they may have their natural position and effect. A picture of this sort is called a *negative;* and those which are taken from it are called *positives.*

Q. When the collodion negative is fixed and dried, is it liable to change?

A. The collodion film is very liable to injury, and it is therefore necessary to protect it by some further process.

Q. How is such protection to be given?

A. By covering the surface of the glass plate with varnish.

Q. What varnish is used for this purpose?

A. Some photographers simply employ a solution of gum arabic, which dries rapidly upon the plate. Others prefer albumen, which they apply to the picture while still wet, and which they allow to dry after passing the aceto-nitrate of silver bath, which coagulates the albumen.

Q. Are not other sorts of varnish occasionally used?

A. Yes; both spirit and turpentine. Spirit varnish dries rapidly, and is therefore more useful when expedition is necessary in the completion of the process. Turpentine varnish will take forty-eight hours to dry. Amongst the preparations employed are the following:—

Copal varnish	1 part.
Benzoin	2 parts.

Or—

Gum benjamin	10 parts.
Spirits of wine (36 above proof) ...	100 parts.

Or—

Gum lac	8 parts.
Spirits of wine (33 above proof) ...	100 parts.
Essence of lavender	16 parts.

A varnish formed of gum amber, dissolved in chloroform, is also used. This varnish is exceedingly durable, but is proportionately expensive. The gum amber should be thoroughly macerated, and mixed with chloroform and ether in equal parts, thus:—

Gum amber	5 drachms.
Chloroform	20 drachms.
Ether	20 drachms.

Q. How is the varnish to be applied to the plate?

A. The back of the plate should be held to the fire until it is thoroughly warm in all parts, but not hot. The varnish is then to be poured on just in the same manner as the collodion, the superfluous liquid being returned to the bottle. The plate, for a short time, may then again be held to the fire, and thus a perfectly even and beautifully polished surface is given to the picture.

SUMMARY OF THE COLLODION PROCESS.

Q. Having been thus particular in these various receipts, succinctly re-state the collodion formulæ. How is the collodion prepared?

A. We have furnished the receipts for two different processes. First:—

Rectified sulphuric ether	1½ ounces.
Gun cotton	16 grains.

Shake, and add to

Spirits of wine (40 above proof) ...	6 drachms.
Iodide of cadmium	11 minims.

Shake, and allow to remain for twelve hours before using.

The second method is—

Rectified sulphuric ether	1½ ounces.
Gun cotton	16 grains.

Shake, and add to

Spirits of wine (40 above proof) ...	6 drachms.

With

Iodide of potassium	1 grain.
Iodide of ammonium	1½ grains.
Iodide of cadmium	1½ grains.
Bromide of potassium	15 minims.
Bromide of ammonium	30 minims.
Bromide of cadmium	30 minims.

Mix in a mortar; add the collodion; shake well together; and allow to settle for four or five days.

Q. What materials are employed in cleansing and polishing the glass?

A. The following mixtures are very good for this purpose:—

Water	500 parts.
Carbonate of potassa	100 parts.

After using the above, the plate should be washed and dried, and then finally polished with rotten stone, nitric acid, and water.

Q. How is the nitrate of silver bath composed?

A. In the following proportions:—

Nitrate of silver	1½ drachms.
Distilled water	2½ ounces.

Q. What solution is employed in the development of the picture?

A. The following solution is found to work well:—

Pyrogallic acid	16 grains.
Citric acid	8 grains.
Distilled water	6 ounces.

Or—

Saturated solution of sulphate of protoxide of iron	2½ ounces.
Water	10 ounces.
Acetic acid	3½ drachms.
Spirits of wine	3½ drachms.

Q. How is the picture to be fixed?

A. Either by a solution of hyposulphite of soda, or a solution of cyanide of potassium. Thus:—

Hyposulphite of soda	6 drachms.
Water	2½ ounces.

Or—

Cyanide of potassium	3½ grains.
Water	2½ ounces.

Q. What is recommended as a varnish for the collodion?

A. Either spirit or turpentine varnish will serve for this purpose; the former, as we have already noticed, drying with much greater facility than the latter, and on this account more generally employed.

(*To be continued.*)

Correspondence.

PHOTOGRAPHIC QUACKERY.

SIR,—The votaries of photography are occasionally the victims of so much quackery and humbug, that it becomes a duty to expose every instance that occurs to us; and I feel certain that such instances would be of rarer occurrence, if the editors of Photographic Journals would aid the duped and defrauded amateur to show up the authors of such disgraceful trickeries. I was, therefore, much pleased to find you had come to the assistance of the correspondent, whose letter appears at page 225, and I am sure I do not stand alone in thanking him for writing, and you for inserting his

communication. Your having done so encourages me to expose a similar instance, of which, about three months ago, I was the victim. I had observed an advertisement, which all last summer had appeared in the columns of one of your contemporaries, offering, for half-a-crown in postage stamps, "a first-rate formula for developing solutions for positives, quick in its action, producing brilliant and clearly defined pictures, far surpassing the generality of photographs." The address was not one hundred miles from Dover; the discoverer of this admirable formula modestly concealing his name. Being, at the time, about to take the portraits of several friends and relatives in the country, it struck me that a solution which would enable me to produce pictures "far surpassing the generality of photographs," was just the thing I ought to have, and I, therefore, inclosed the prescribed fee in a letter. By return of post I received the precious formula, and, eagerly opening it, read as follows:—

"FORMULA FOR DEVELOPING SOLUTION FOR POSITIVES.

Protosulphate of iron	2	drachms.
Nitrate of potash	1	,,
Common water	7	ounces.
Glacial acetic acid	3	drachms.
Alcohol	8	,,
Nitric acid	4	drops.

Fix with cyanide of potassium.
Use ———'s collodion."

Judge of my astonishment on finding that I had been purchasing a formula almost identical with that which I had been using ever since I took my first lesson in positive portraiture. The advertiser had, in fact, sent me the common protonitrate solution, with rather an excess of glacial acetic acid and alcohol, and four drops of aquafortis! I at once saw that I had been taken in, and that, too, in the coolest manner. I had nothing whatever for my money, except the information that I might continue as I had gone on, fix with cyanide of potassium, and use ———'s collodion! Very satisfactory, and very gratifying! I mentally vowed never to become the dupe of another similar advertisement, and your numerous readers will do wisely to make a similar resolve. C. ALVYN.

SPONTANEOUS RESTORATION OF DRY COLLODION PLATES.

SIR,—I have been much startled by reading a paragraph in vol. i. p. 238 of the "PHOTOGRAPHIC NEWS," wherein it is stated to the "North London Photographic Association," from a communication read before them from Dr. Hill Norris, on "Dry Collodion Processes," viz., "On the subject of the retention of the invisible image, the author stated that *dry collodion plates* possessed the singular property of gradually returning to their original condition if kept in darkness for some time after exposure." This leads me to suppose if by any accident light should be admitted to dry collodion plates, though it would spoil them for immediate use, yet by keeping them in the dark for some time after, the plates would return to their former state: would you or any of your numerous correspondents kindly give me a reply to the following questions?—

1. How long would it be before a dry collodion plate would return to its original state, after exposure, if left in the dark?
2. Would the plate be available for taking another image?
3. If light be accidentally admitted into a box containing dry collodion plates *for a very short time*, will those plates be entirely spoiled, or will placing them in the dark make them again useful? DURHAM.

Photographic Societies.

CONVERSAZIONE OF THE HALIFAX LITERARY AND PHILOSOPHICAL SOCIETY.

THE annual meeting of the Halifax Literary and Philosophical Society, and also a *conversazione* devoted exclusively to photography, were recently held in the Museum. As the latter was the more attractive of the two, we condense the business report into a small compass. The president, J. Waterhouse, Esq., not being yet sufficiently recovered from a recent severe illness to attend an evening meeting, the chair was taken by Jas. Stansfeld, Esq. The report of the past year, which was read by J. E. Norris, Esq., stated that, owing to the almost unanimous voluntary increase of the subscriptions of the members last year, the debt then due had been discharged; but that the expenditure of the society (some of it from extraordinary causes) had, during the past year, exceeded the income, and an appeal was therefore made to the members to canvass for new subscribers. Owing to this deficiency of income, and also to the fact that, under the existing arrangements, no less than 3,633 visitors had been admitted free to the Museum during the past year, with subscribers' orders, the council had declined an application made to throw the Museum open to the public. Several valuable additions had been made to the Museum, for which the council thanked the contributors. Amongst those which we have not previously noticed, are about fifty specimens of Peruvian minerals, by J. Waterhouse, Esq., and several interesting Chinese articles, by E. Luscombe, Esq., War-office.

The officers for the ensuing year were then elected; the only change from the previous list being the election of E. Akroyd, Esq., M.P., and John Lister, Esq., Shibden Hall, to be vice-presidents; and the substitution in the council of Jno. Abbott, Esq., and Mr. Stott, for Dr. Kenny and Jas. Riley, Esq.

The following gentlemen were ballotted for, and elected new members:—E. Haigh, Esq.; J. E. Sowerby, Esq., The Hollins; Mr. Jones, surgeon; and Mr. Christopher Rigg.

And now for the *conversazione*, for which considerable alterations had been made in the arrangement of the room, and in its lighting. The wall cases were all covered with drapery for the display of the larger photographic works; the tables placed down the centre of the room so as to furnish glass-casing for smaller articles, were surmounted by a rail for the reception of framed photographs. Every space was occupied, and that without the display of a single inferior specimen. Thanks to the combined taste and munificence of the exhibitors, the photographs shown were of the best of their respective classes; so that, although as to extent the exhibition could not cope with some photographic displays in larger towns and cities, in universal excellence it would bear the most critical comparison with them. A brief reference to some of the specimens is all we can give without trespassing too much on our space.

Mr. W. Best, of Leeds, sent some exquisite photographs of well-known prints.

Mr. Lyndon Smith displayed his famous photographs of Heidelberg, the Rhine, and also of the porch of Adel Church, and the unfinished tower of Bolton Abbey, all taken by the wet collodion process.

Mr. W. S. Ward, on the other hand, showed three large photographs (two of Fountains and one of Kirkstall) taken by the collodio-albumen, or dry process; and the exquisite detail obtainable in the deepest shadows which this process, above all others, is capable of giving, may be commended to the notice of all ardent amateurs.

From Mr. T. W. Stansfield, Leeds, came several of his photographs of Whitby, Rievaulx, and Kirkstall Abbeys; of the three Saxon crosses in Ilkley church-yard, and of the Wharf, and the remarkable metallic-looking rock facing Bolton Abbey.

Mr. J. W. Ramsden, of Leeds, sent several fine transfers, from his negatives, of scenery in the Lake district, and at Bolton Abbey, and also several photographs of machines. Whilst the latter show how useful the art may become to all manufacturers; the former, especially in their sky effects, show what may be done towards making photographs works of real art as well as of sun-painting.

Mr. Waterhouse (the president of the society, whose services in the photographic art are probably better known everywhere else than in his own native town) sent no specimens. But there were exhibited by E. Haigh, Esq., some views—of Bowness, Bolton Woods, Sour Milk Ghyll—toned by Mr. E. Gregson, photographic artist of this town, by Mr. Waterhouse's new process, whereby it is hoped to secure permanency to these beautiful, but hitherto hopelessly fleeting, miniatures of nature. Mr. Waterhouse's formula, substituting alkaline gold, promises this great desideratum.

Mr. Gregson also exhibited his stereoscopic slides of Beacon-hill, Scenes in the Park, Nab Glen Fall, near Haworth (the favourite scene of Charlotte Bronte).

Mr. E. Gledhill, of Halifax, exhibited similar slides of his views of the Park, Shibden Hall, Beacon-hill tunnel, Mr. F. Crossley's Almshouses, and also a pic-nic scene which showed artistic taste in the arrangement.

E. Haigh, Esq., exhibited a large portfolio of his photographs, among which we must notice several large views of the statuary in the Park, several of Kirkstall Abbey, and many stereoscopic slides (one of Sour Milk Ghyll, rivalling the best productions of foreign artists); and, during the evening, Mr. Haigh exhibited De la Rue's valuable stereoscopes of the moon, &c.; also a number of microscopic photographs.

H. Salt, Esq., sent his photograph of his father's bust, at Saltaire, and several architectural views in Venice.

Mr. P. H. Wilkinson (besides contributing many stereoscopic and ordinary photographic cameras, slides, stereoscopes, &c.) sent a photograph of Mr. Joseph Durham, the sculptor of F. Crossley's statue, taken by Dr. Diamond.

J. B. Holroyde, Esq., sent his portfolio of photographs, amongst which were two large views of the picturesque old Shibden Hall.

Mr. Joshua Horner sent a large photograph by Bisson Frères, of the Hotel de Ville, Paris; Mr. Whitley several Venetian views, similar but in different tone to some exhibited by Mr. Salt, and also some views transferred from paper negatives (the calotype process), a sharply-focussed view of a Stone Well at Venice, showing every indentation of the weather, and an interesting view of the great Cathedral at Cologne.

Messrs. T. and W. Birtwhistle sent several copies of engravings, and White's original views in the harvest-field; and M. Schischkar some exquisite photographs of flowers. We come last to the varied and valuable contributions sent by E. Akroyd, Esq., M.P., which alone occupied more than half the space in the Museum. Amongst these were Fenton's Photographs of the Crimean War, taken under extraordinary difficulties, and published, alas! in such haste that they are already more than half faded away, and threaten to become soon wholly obliterated, —Maull and Polyblank's portraits of living celebrities, itself a gallery worthy a whole evening's attention,—copies of two of Raffaelle's paintings, and of Giotto's Dante,—H. P. Robinson's "Fading Away," a photograph from the life, which is perhaps the best composition scene ever photographed,—large views of the castle of S. Angelo, the Coliseum, the Arch of Titus, and St. John Lateran at Rome; the Ducal Palace and Bridge of Sighs at Venice; the Mer de Glace, Switzerland; the Temple of Neptune at Pœstum, and the exhumed Temple at Pompeii; four of Gustav le Gray's famous sea-pieces, wherein the foam of the broken wave has been caught and instantaneously fixed; many large views of Paris; some photo-galvanographs, *i.e.*, pictures printed from copper-plates engraved by the sun; and a photograph of G. G. Scott's monument to the late Sir C. Hotham, governor of Australia, showing how an architect may learn how the artists and workmen are carrying out his drawings, without the expense and time lost in a personal visit.

During the evening a paper on the art was kindly read by E. Haigh, Esq.

French Photographic Society.

At the last meeting of the French Photographic Society, M. Balard, of the Institute, in the chair, after the dispatch of some routine business M. Paul Perier announced, in the name of the committee of administration, that it had prepared regulations for the third exposition which is to take place in April of the present year. (See the present number of the "Photographic News," p. 245.)

The members of the commission charged to examine the pictures sent for exhibition are:—MM. Count Olympe Aguado, Bayard, Bertsch, Cousin, Edouard Delepert, Davanne, Leon Foucault, Hulot, Jeanrenaud, Lemaître, Count Leon de Laborde, Le Gray, Adolphe Moreau, Peligot, Robert.

M. Girard presented to the society sundry carbon proofs which had been forwarded to him by Mr. Pouncey, to which two printed notes were attached marked "not for publication." In accordance with the desire of Mr. Pouncey this note has been sent to the commission appointed to award the prize given by the Duc de Luynes.*

* *Luynes*, not *Layne*, as a contemporary persists in spelling it.

MM. Davanne and Girard presented a continuation of their paper on photographic positive proofs, and exhibited several pictures in support of their communication, and in return received the thanks of the society.

M. Marion then read a paper stating that he had manufactured an apparatus on a plan suggested by MM. Davanne and Girard, for preserving sensitised papers; and requested that the box might be sealed until a day or two before the next meeting, and a commission appointed to open the box then, and experimentalise on the paper contained in it, and inform the society of the result. He concluded by saying, "I have made these boxes in the simplest manner, in order that they may be vended at a low price, at the same time that they are perfect. I shall be able directly after the report of the commission to deliver to the photographer, not only conserving apparatus of different shapes, but likewise papers ready nitrated, and that he will only have to place in his frame, without modifying his ordinary method in any way. I may observe that the use of this apparatus will in no way interfere with the habits of the photographer, and that he will simply have to put the sheets in the box in the same way as he would put them in an ordinary portfolio; and it is equally easy to put them in or take them out at any moment."

MM. Bayard, Civiale, and Paul Gaillard, were named to report on the paper.

M. Frank de Villecholle called attention to the fact that M. Cognacy had presented a box for the same purpose to the society, but at the moment he was about to describe it the president reminded him that if he described it he could not patent it, upon which M. Cognacy retired.

M. Girard replied that he could find no entry of such invention at the patent office.

M. Quinet presented a collection of proofs to the society obtained by means of paper prepared in a peculiar manner, which might be kept several months before or after exposure without undergoing alteration. He did not reveal his process.

M. Davanne exhibited a portable photographic apparatus which he had had constructed by M. Koch.

M. Hermagis presented a paper on the subject of the stereoscope presented to the society in his name by M. Ferrier nearly twelve months ago.—*Condensed from the Bulletin of the French Photographic Society.*

Miscellaneous.

A Mr. Henry Coxwell, writing to a daily paper on the subject of exploring the interior of Australia by means of balloons, says:—"The expedition will be provided with a photographic apparatus to stamp with truthful and indelible outline a series of bird's-eye views, the indisputable correctness of which will be invaluable, with written records of passing scenes. Viewing calmly the danger likely to accompany such an attempt, I do not think it can fairly be pronounced greater than that which attends an arctic voyage, or any other which originates from a desire to attain useful knowledge by intrepidity and personal risk."

Photography in America.—In England we have already become accustomed to the announcement of photographic publications, there have been many valuable works published in the volume shape, and we have an Art Journal illustrated by means of photography; but as yet we have not had any application of the art in the "getting-up" of gift-books. By "getting-up" we mean that Christmas style of book, which is so well known for its beautiful binding, and engraved illustrations by book illustrators. As yet, English publishers have not attempted the illustration of books of this class by means of photography,—at least, to any great extent. Our transatlantic friends are to be first in the field, and, according to the New York special correspondent of an able contemporary, we are informed that a publishing house in that city is about to bring forward a volume which will, in the cant phrase of the day, inaugurate a new era for illustrated publications. The work which it is proposed to place before the public, is a collection of photographic illustrations to Longfellow's latest poem, "Miles Standish." The photographs, eight or ten in number, are from drawings by an artist of German origin, J. W. Ehninger, by name, who superintends the photographic process, and the

general arrangement of the novel work. His designs are admirably conceived, and pleasingly executed. The photograph lends, of course, that peculiar depth and richness to the picture, in which it excels the softest etching; and the artist who is to execute the copies, avows himself confident of their durability. "At least," he says, "they will last a generation;" and in America what more can be asked? The present is a most unfavourable season for this undertaking, as only five hours, at most, are available for the photographer, and every day of rain or snow brings us to a standstill. We shall look with interest to more extensive application of this means of illustration.

Photographic Notes and Queries.

TONING PAPER POSITIVES WITH PLATINUM.

SIR,—At p. 214 of the "PHOTOGRAPHIC NEWS," one of your correspondents, I see, wants some information upon the subject of toning with platinum instead of gold. M. de Caranza, a Frenchman, of scientific repute, who has been travelling for upwards of twenty years in the service of his government in Turkey, exposed, three years ago, some very remarkable pictures of Constantinople and other eastern cities. I believe they were all toned with platinum; and in the French journal *La Lumière*, of February 23, 1856, he favoured the public with the following formulæ:—The picture should be much overprinted, and afterwards immersed in a solution of 2,000 grammes of water, 1 cubic centimètre of chloride of platinum of about the density of syrup, and 30 grammes hydrochloric acid. After a few seconds' immersion the metallic parts grow black, and the whites brighten up. The picture is then washed; and it is advisable to change the water six or eight times, and to add a little chalk the fourth or fifth time, to neutralise whatever hydrochloric acid the paper might have absorbed. The subsequent washing to take place again in pure water. The picture is fixed in hyposulphite, 1 part to 6 of water. I have lately followed this method with decided success, and I think it has some very great advantages over the toning with gold; the general appearance of the picture after finishing being superior and less bluish, especially in the light parts. The results for albumenised paper are equally good, although I must candidly confess that I think them better for ordinary salted paper. It is true that this toning bath is not so active as one with gold; but I consider this an advantage, since the rapidity of action in a *new* gold bath frequently spoils the picture. (I always tone before fixing.) However, care must be taken not to leave the paper too long in the bath; ten or twelve seconds will suffice in ordinary cases, and if the effect be not very apparent to the eye, experience will show that the chemical change has really taken place so soon as the picture comes into the fixing bath, where it readily takes a most agreeable colour. To improve the general effect, I would advise to dry rapidly before a brisk fire, and to polish the picture, when mounted, with a mixture of wax with oil of spike. Thereby the details are shown far more distinctly, whilst I think the picture is preserved, in a great degree, against the deleterious effects of a generally wet climate, as yours and ours decidedly are.

If these observations seem of any interest to you, they are entirely at your disposal, for insertion in the pages of the "PHOTOGRAPHIC NEWS." I am further making experiments upon a dry collodion process (not of my own invention), which is very simple, and in the meantime leaves a film as sensitive as wet collodion. In a few weeks I shall be able to give you further information upon this subject, if you will allow me.

HERMAN L. T. HAAKMAN.

Amsterdam, January 20th, 1859.

[We beg to thank our correspondent for the above valuable information, and shall feel great pleasure in receiving further communications from him on the above or other subjects.—ED.]

THE RASPBERRY SYRUP PROCESS.

SIR,—Ere this I expected to have seen some account of the success of the raspberry syrup process, from some of your numerous correspondents. Having been so far disappointed, I venture to state that, in my hands, it has exceeded, not only all other dry processes, but much beyond my most sanguine expectations. In proof of which I beg to inclose positive prints from negatives, obtained last week in 35 seconds' exposure, with plates prepared just three weeks before. Also two from prints—"Christ Prophesying over Jerusalem," and "Chapeau de la Brigand." I do not send them as first-rate productions, but just to show what can be done with plates prepared with this syrup. The facility with which they are prepared, and the little liability of being spoiled, is a great recommendation; and I trust you will shortly give us, in the "NEWS," the experience and success of others.

In Mr. Sidebotham's late communication on the collodio-album process, he states that—"It is well in all cases to expose sufficiently long, as an over-exposed picture can be made good, but an under-exposed one cannot." Pray will you be kind enough to explain more fully the first part of this paragraph, as to how an *over-exposed* picture can be made a good one? for I have generally found that the exposure required for the dark shadows of a landscape materially injures the light parts.

By slightly albumenising the plates, and drying them before collodionising, they appear to withstand any amount of washing, &c. M. P. M.

[The prints forwarded by our correspondent are very satisfactory.—ED.]

GELATINE PAPER.—YELLOW ILLUMINATING MEDIUM.

SIR,—I can assure your correspondent R. O. F. S. that yellow or orange-coloured gelatine will answer all the purposes of glass. I have tried the small yellow squares sold by grocers for confectionery purposes. Perhaps it is not generally known that a strong solution of gelatine poured on a bright smooth *tin* plate will release itself when dry, while if poured on glass it adheres tenaciously. I imagine that gelatine paper may be readily made by the former process, for the upper surface would necessarily be parallel with the lower, and equally bright and smooth.

For windows, however, its transparency would be objectionable—it should be ground as glass is, so as to diffuse the light. I should think that tissue paper painted on both sides with strong gamboge, which can be purchased in its raw state at the oil shops, would answer your correspondents' purpose; it should be varnished with the varnish sold for the imitations of stained glass on paper (I forget the name given), and with the same varnish it may be fastened to the glass. Gamboge will mix with oil or water, and perhaps if mixed with the varnish it might be less liable to bleach by the sun's rays. H. E. N.

GLASS BATHS.

SIR,—The way I have made my baths and trays with glass is, first of all to make a shell of wood, not liable to warp (mine is made of walnut), a little larger than required to allow for the thickness of the pieces of thin plate glass; the pieces of glass are then cut to fit inside of it as close as possible; I then pour inside a warm solution of gutta-percha; fit in my glasses, and make them bed well; when set, which will be in a very short time, I pour in a thin solution of shel-lac only along the joints to fill up crevices; and when nearly dry, finish them with a strong solution to make all neat. The pieces of glass are to be a little higher than the wood, to allow the solution to be poured out. These cemented glasses are more durable than the blown or cast ones that are bought, and a great deal more economical. J. R.

GLASS ROOM.

Several correspondents having asked for information on the above subject, we shall feel obliged if some of our readers will favour us with particulars respecting the most convenient arrangement as to ground plan, fittings, elevation, and aspect; together with the estimated cost either with or without fittings.—Ed.

ANSWERS TO MINOR QUERIES.

Chloride of Ammonium for the Salting Bath.—*Eusebius.* This salt is frequently used in the salting bath for positive paper, but, chemically speaking, it is not by any means the best substance to use, as, if the solution of chloride of ammonium in albumen be kept for any length of time, it liberates ammonia in sufficient quantities to be offensive, and as it thus becomes alkaline, the positive paper will be much deteriorated in its clearness and permanency. Chloride of sodium (common salt), or chloride of barium, is preferable; the objection sometimes made to the former on account of common salt being impure, shows great ignorance of chemistry: good table salt is sufficiently free from impurities for any photographic purpose, and if impure compounds *are* used, the impurities in chloride of ammonium are more liable to be injurious than those in common salt; moreover, it is absurd to be so over-scrupulous about the purity of any compound which is to be dissolved in a substance like albumen, which contains far more impurities than could possibly be present in table salt. The argument of economy, which is sometimes adduced in favour of the ammonium salt, on account of its containing more chlorine, weight for weight, than chloride of sodium, falls to the ground when we tell you that chloride of sodium costs as much per pound as chloride of ammonium per ounce; and as good printers do not advise the loading the paper with a superfluity of chloride, the slight saving in bulk is immaterial. We have thus given you, at your request, the *chemical* reasons for not preferring chloride of ammonium; but, at the same time, we must say, that several excellent formulæ for printing are to be found in our back numbers (for instance, at p. 86), in which the ammonium salt is used; and as these are successfully employed by many excellent operators, you can well imagine that it is not of so much consequence which you use, if you do not put the paper to very severe tests, such as long keeping in a damp place, or such like.

Blue Tinge on Glass Positives.—*C. R.* A correspondent has kindly informed us that the reason of the occurrence of the above stains is, the mixing of the developing and fixing solutions. If the plate be washed *thoroughly* before fixing, the tint complained of will not occur again.

The Pseudoscope.—*A. E. X.* This is an instrument devised by Professor Wheatstone for effecting the *conversion of relief*. By its means the relative direction of rays reaching the eyes is inverted, and a corresponding impression of inverted relative position of different parts of an object is produced. The illusion is most extraordinary, a concave surface, as that of a bowl, appearing to be convex, and, *vice versâ*, a convex surface, as that of a globe, concave. It is formed of two rectangular prisms interposed between the eyes and the object, in such positions that the rays of light from any object in front being refracted at the first surfaces, then reflected internally at the backs of the prisms, and again refracted at their second surfaces, will enter the eyes in reversed positions, and thus the relative position of the rays will be inverted. Messrs. Bird and Brooke give the following interesting remarks on this subject:—"The delusive impression is not immediately produced in some individuals in whom the judgment appears for some time to contend successfully with the visual impression, but sooner or later the judgment gives way, and the object suddenly appears to be turned inside out; thus completely falsifying the old adage that 'seeing is believing,' for we are unable to resist the visual impression, although we know it to be erroneous."

Pyrogallic Acid in the Nitrate Bath.—*H. C. R.* has accidentally spilled some pyrogallic developing solution in the nitrate bath, and consequently the latter will not work properly, but gives pictures covered with muddy streaks. The best remedy that we know of is, to expose the solution in a flat-bottomed dish to the full sun for an hour, and then to add water to supply that lost by evaporation, filter, and add a few drops of acetic acid if necessary.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

We must beg our correspondents not to send glass plates through the post, except they are securely protected against breakage.

R. D.—Your negative arrived completely smashed. From an examination of the pieces we suspect the fault to be due to over-exposure in the camera.

E. M.—1. Try 4 grains of iodide of ammonium to the ounce instead of 6 grains. 2. Focal length 3½ inches, if by a *good* maker.

H. Haakman.—1. The article you inquire about will shortly be advertised in our columns, by the gentleman who took the views referred to. 2. We are sorry we cannot give you the printing and toning process used; our own at p. 86 will, however, answer equally well. 3. *Papier Saxe* is sometimes used, but in any case the stereograms are glazed or varnished afterwards, in order to give them the gloss you speak of. We are much obliged for your communication, and shall be happy to hear further particulars.

X. Y. Z.—No; certainly not.

Negative.—1. The positive developer with iron may be used a second time, but it will not be so energetic. 2. Consult back numbers. 3. They will be inferior. 4. See p. 86. 5. Yes.

J. W.—We are sorry we cannot give you the information you ask for; but we have had no experience in the apparatus you mention.

J. L. D.—1. Your formula is not so good as the one we recommended; it would not be alkaline. Your fixing bath is far too dilute: use 1 part of hypo. to 4 of water. 2. Try the collodio-albumen process, given by Mr. Sidebotham in a previous number; and see a letter from the same gentleman recently inserted. We shall be pleased to see your results.

A Macclesfield Amateur.—Your stop is much smaller than it need be; ½ inch aperture would be quite small enough with a lens 6 inch focus.

W. S. B.—The specimen of protosulphate of iron which you have forwarded, as being prepared according to the receipt given in our last number, is perfectly pure, and need not be recrystallised. Our correspondent states that the following are quantities which he used, according to the method there given:—iron filings, 8 ounces; sulphuric acid, 14 ounces; water, 4 pints.

S. E. Law.—We are much obliged for your suggestions, and will give the matter serious attention.

John.—We think so.

J. L. F.—Your print is very good; we would have noticed your picture in our review of the exhibition, but could not find your name in the catalogue. Will you favour us with the details of your quick process? We have heard of the collodion film cracking, after a lapse of some years, and attribute it to the varnish being inferior; but we do not think the cause of this annoyance is really known.

W. J.—Your lens would do for views if it were stopped down to about half an inch aperture, but we could not tell you the field it would cover without an examination.

A Subscriber.—1. Neither pyrogallic acid nor chloride of silver will take any harm by being kept in paper in the dark. Nitrate of silver, however, should be kept in a stoppered bottle. 2. The size of the diaphragm and its distance from the lens, will depend upon the size of the latter. 3. The "simplest way to ascertain when a bath is in proper working order" would be, in our opinion, to take a picture with it.

Δ.—We are much obliged for the report, and shall always be glad to receive similar information. The fault must be in the paper you employ; try some other make.

J. C.—The half plate portrait lens will answer better than the 3-inch single lens for the purpose of enlarging a small picture.

P. S.—1. We believe that collodio-albumen plates prepared as far as spreading the albumen, will keep for a considerable time in a dry place. 2. We like the process you have marked (ii.) best.

Bengalee.—We decidedly think that the collodio-albumen process will be the best to carry on in India, both as regards facility in manipulation and fewest traps to carry. Perhaps some of our correspondents who may have had experience in working in a similar climate, will favour us with their experience.

Fathom.—Leave out the nitric acid from the developing solution, and if that does not remedy it, fix it with hypo. instead of cyanide.

H. Doubleday.—Will you kindly favour us with a full description of the construction of and mode of using your substitute for a tent? as it will be of great use to many of our correspondents.

Reuben.—Follow the process at p. 86.

Durham.—Thanks for your communication. Your concluding suggestion would, we fear, be impracticable at present, owing to the slow nature of ordinary photographic printing.

W. G. O.—If the answer to X. Y. Z. will not help you, we cannot assist you further without seeing your lenses.

T. L. H.—Articles on the subject are in preparation.

J. Berry.—We will shortly give the best formula.

W. A. Baily and Vignette.—Received with thanks.

Erratum.—In our review of the Exhibition of the Photographic Society, last week, we erroneously spelt a gentleman's name Crittenden. It should have been Cruttenden.

Communications declined with thanks:—F. S. A.—Hypo.—Thompson.—A Printer of Stereograms.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—John F.—A. B. T. (Dundee).—Zampa. (See our Notes and Queries.)—J. T.—S. Artridge.—H. B. Y.—Novice.—Caleb.—W. A. T. W.—C. A. P.—Monk.—Hypo.—A. B. C.—No. 6.—Verdant.—William.—A Subscriber.—A. A. B. B.

In Type:—C. A. (Algeria).—A Subscriber.—H. E. N.—E. R.—W. Cochran.—Viator.—T. B.—H. S. L.—E. Pepper.—An Amateur.—E. H.—W. D.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

⁎ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 22.—*February* 4, 1859.

A NEW METHOD OF TONING WITH CHLORIDE OF GOLD.

BY M. LE GRAY.

[The following letter was addressed to M. Regnault, of the *Académie des Sciences.*]

I shall be obliged if you will have, at the next meeting of the Academy, a sealed packet opened, respecting the toning of paper photographic proofs, which was deposited by me on the 13th of January, 1858.

I beg you will at the same time rectify an erroneous statement which I believe I committed in that communication, and to submit to the judgment of the Academy the following improvements which I have introduced into my process.

The correction to be made is, instead of water salted at 50 per cent.,

Water strengthened with 50 per cent. of water salted to saturation	... ...	1000 parts.
Chloride of gold	... ...	6 "

The modifications I have made in my process consist in the substitution of chloride of lime of commerce (hypochlorite of lime) for the chloride of sodium, and in the more exact quantities pointed out by experience.

In considering this new mode of fixing, my object has been to produce the same effects that I pointed out some years since, in a memoir on fixing with the chloride of gold acidulated by hydrochloric acid, in evading the inconvenience of the reaction of the acid on the hyposulphite of soda.

I had succeeded in the substitution of the alkaline salt for the acid salt indicated in my preceding communication, but the object was not entirely attained; the chloride of sodium did not completely remove the yellow tint that positive paper often acquires, especially albumenised paper, which has been prepared for any length of time.

It behoved me, therefore, to push my researches further, and I believe that I have at last succeeded, by availing myself of the decoloring principle of the chloride of lime.

The formulæ and manipulations consist—

1. In freeing the proof, by washing for a few minutes in two waters, from the free nitrate of silver contained in the fibres of the paper.

2. In submitting the proof to the action of an auriferous bath thus composed:—

Distilled water	... ...	1000 parts
Chloride of lime of commerce in white powder (hypochlorite of lime)	... ...	8 "

Filter and add:—

Chloride of gold (dissolved in 100 grammes of distilled water)	... ...	1 "

The picture acquires in this bath a black tone which gradually tends towards a *blue*, at the same time that the yellow tint is restored to a brilliant white. It requires from ten minutes to a quarter of an hour to produce the maximum effect of this method of toning. Practice will be the best guide to the attainment of any particular tone. Nevertheless, as some guide in preliminary essays, I will observe that by leaving the proof for one minute in the bath, a violet-red tint will be obtained after fixing with hyposulphite, and a very clear blue-black tone after a sojourn there of an hour or two.

In this time the proof passes from violet, through all the intermediate tones, up to a deep black in the shadows, and afterwards from the black to blueish tones, becoming gradually weaker and weaker; of course, I mean after the final fixing in the hyposulphite of soda.

There are, therefore, two periods; the one ascending in the scale of intensity, the other descending.

3. To pass the proof anew in a bath of pure water, twice charged, to remove the chloride of lime. This washing may be performed very rapidly.

4. To afterwards fix the proof in a hypo. bath composed of one volume of hyposulphite of soda in crystals to six volumes of water.

This bath ought to be used for only a small number of proofs, the object of it being to remove the chloride of silver not acted upon by the light, which is contained in the fibres of the paper. The effect is produced in from ten to fifteen minutes, according to the temperature.

As soon as put into this bath the proof loses a little of the black tone which it had acquired in the chloride of lime bath, and passes to more violet tints.

If the tones thus obtained are satisfactory, the ordinary washings in water may be at once proceeded with, and the proof dried; but, notwithstanding, I would advise, with a view to its perfect stability, to carry it through the whole series of operations.

5. To bring the proof to the final tone in a bath thus composed:—

Distilled water	... ...	1200 parts.
Hyposulphite of soda	... ...	200 "
Chloride of gold	... ...	2 "

The proof ought not to be left in this bath less than fifteen minutes, as that is the minimum time necessary to insure the permanency of the picture, but it may be allowed to remain in it for as much longer as is requisite for obtaining the desired tone.

6. To continue the washings in water in use in the old processes, especially recommending a washing in warm water to remove all trace of the salts.

I must observe that the proofs obtained by this process, beside the fine qualities of tone which they offer, have the advantage of not changing with time, a result I have verified on portraits which I fixed by this means more than eight months since . . . . . . The advantages of this new method of fixing, consist principally in this, that it avoids the decomposition of the hypo. bath by the exclusion of every trace of free nitrate of silver in the proof, and that it preserves a very harmonious black tone in the proof, communicated to it by the gold bath; a tone which is not destroyed by a lengthened sojourn in the hyposulphite of soda, the destructive property of which is well known.

I would also remark, that, in the old method of fixing with the bath of hyposulphite of soda and chloride of gold, the cause of the destruction of the pictures was the presence and formation of an acid occasioned by the use of this bath, which in time led to its decomposition. I have succeeded in restoring its original qualities to this bath by mixing carbonate of baryta with it, and then filtering. It resumes then the qualities of a new bath, and gives pictures of great permanency.

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.*

WHILE on the subject of "first appearances," we must not forget to congratulate Messrs. Delferier and Beer on their *debut* in the photographic world as composers. They, too, have attempted some Oriental scenes, and with very great success, because they have what we have just urged, viz., the natives of the countries, whose customs and manners they attempt to illustrate, for their models. The picture of "The Caravan in sight" is most effective and pleasing; and the expression of the man's face as he pulls the curtain of the tent on one side to catch the first glimpse of the approaching caravan, is well done. There is true feeling in the picture, and an absence of that stiffness of which we have complained in other compositions. Of "Medora" (77), we cannot say much, though there is great taste displayed in the arrangement, as there is also in the picture of "Arabs entertaining a Turk" (81). In this picture, as in Number 78, there is a real Turk and a real Arab, and this, added to the proper national dress, gives the picture a pleasing reality. The frame containing "Preparing for the Market," and the "Dead Bird" (78), is interesting as a specimen of good arrangement. The expression of the female in "Preparing for the Market" is perfect. She stands beside the half-packed hamper with her finger to her lip, as though she were puzzled what next to put into the hamper. The arrangement of the apartment is very perfect, and has this merit, that it is not—as many pictures of this class are—crowded. The "Dead Bird" is similar in composition; but as an *ideal* picture is far below the other one. The most successful compositions by these gentlemen, and, indeed, in the whole exhibition, are "Forty Winks," and "One Wink" (82). In the first we have an [illegible]man in his cabin, surrounded by nets and lines, cor[illegible]d all the other necessary fishing tackle, arranged in a most natural and effective manner. The old gentleman, evidently overcome with his day's labour, is quietly dosing, his head resting on his hand. The sleepy expression of the old fellow is worthy of Collins, who is so successful in his studies of fishermen. The sleeper evidently enjoys his "Forty Winks." In "One Wink," however, we have the same old piscator, rather more lively and sprightly. He has in hand a huge square-shouldered stone bottle, from which he has just replenished a large goblet; and, judging from the very humorous, sly, and knowing "wink" which he casts at the spectator over his shoulder, we may safely arrive at the conclusion that the liquid which he has taken from the stone bottle is something stronger than that which teetotallers generally imbibe. The expression displayed in these pictures, in the broad humour of the characters, and the clever tact with which everything is put in its proper place, at once bespeak for these gentlemen an artistic knowledge of no mean order. They are entirely free from that vulgarity which we have spoken of in other compositions. The pictures by these gentlemen may be considered legitimate, and among the best specimens of the compositive art.

When we noticed Mr. Morgan's landscapes in our last number, we purposely omitted reference to his two pictures of the "Wheat Field" (102 and 114), because we thought that they belonged more properly to the compositive. We have often heard it urged against Linnell, jun., that he was too minute in his rendering of landscape pictures, and that, while not an ultra pre-Raphaelite, he bordered too nearly on that style. But to those objectors we would recommend the study of these two beautiful subjects by Morgan. The sheaves are taken in the most natural positions; and we think that no greater compliment could be paid to the artist than the remark we heard a lady make, "Oh, that's a copy of a picture which was at the Academy last year."

We must conclude these remarks on composition, by naming a large picture which has been taken by F. Elliot, of his stereoscopic slide, "The Inventory" (500), of which we have already spoken, as also of "Homeless and Houseless" (566). We know not whether the composer of this picture has entitled this reproduction "Homeless and Houseless" on account of the great interest which is being taken in that unfortunate class, through the powerful influence of the press. We are sure of this, that if it is so, the artist has sadly failed to give us an ideal representation of what the writer has so powerfully depicted. The "Homeless and Houseless" is too prettily romantic, and the background views are too picturesque; while the pretty face of the "Homeless" has too contented a look to excite pity, or in any respect to correspond with what we have read of in St. Giles's and Rose Alley.

And now we come to a subject on which we have been very frequently attacked, because exception has been taken by some to what we have said on it; we need hardly say we allude to "questionable subjects." We are astonished to find that the hanging committee have admitted a stereoscopic piece of a kind which has from time to time been condemned. We are glad that, among the leading notices which have appeared of the exhibition, what we have said on other occasions has been reiterated by most of the leading journals. Speaking of the present exhibition, the *Times* says that, "when the stereoscopes are not landscapes or portraits, the slides are '*snobbish*' to a painful degree." Another contemporary says, "One other set we notice for the sake of a protest against their presence here. Stereographs of 'fast' young men, looking from a hiding-place in the cliffs at girls preparing to bathe in the sea, or 'ladies' in full dress, leaning over a balcony, their development exaggerated by a well-known stereoscopic trick, are not what ought to be found in a place like this; and those have neither novelty nor superior executive skill to atone for their intense vulgarity of sentiment. The Council will do well to ask themselves whether it be even now too late to remove what has called forth a general expression of disapproval and surprise." Another contemporary says—"Mr. W. H. Bosley's frame lends a countenance to the abuse of the art to be seen in some of the shop windows, which it ought not to find on those walls." We think that our readers will see that there is a pretty general and widespread feeling against this class of pictures, and will tend to prove that what we have from time to time said on the subject has not been uncalled for.

In portraiture the collection is peculiarly rich, though, perhaps, not interesting. On this subject, we cannot do better than extract some very able remarks from our able contemporary, the *Literary Gazette*:—"Portraits elaborately 'touched,' and often highly coloured, of nameless individuals of both sexes, are as numerous and as prominent as at our Exhibition of the Royal Academy; and, if possible, their presence makes itself even more disagreeably felt here than there. At the Academy they are for the most part 'above the line,' and you can escape the infliction by not looking so high. Here, right on the line, you see not merely frame after frame, having in the catalogue against the numbers simply the word 'portrait,' but an almost interminable succession of 'frames of portraits,' each containing half-a-dozen, or a score, as the case may be, of nameless and meaningless faces, like the cases you see hanging outside the shop doors in Regent-street or the Strand. Ordinary photographic portraits of persons of whom you know nothing and about whom you care less, are, probably, of all the wearisome things with which this world is encumbered, the most entirely and irredeemably wearisome."

T. R. Williams is, of course, the first in *untouched* photography, and beautifully does he produce those exquisitely fine vignettes, which are so charming and attractive as specimens of pure photography. A Russian, of the name of Chlaponin, has sent some very interesting studies and portraits; the peculiarities in his pictures are, the intensity of the black tone, combined with great softness and half tint. His picture "The Queen of Spades" (352), is really a

* Concluded from p. 242.

charming thing, and should be ranked among the curiosities of the collection.

There are many coloured photographs in the exhibition, the leading contributors being Lock and Whitfield, who have some elaborately finished miniatures, but which are by no means so artistic as "portrait" (402), by Henry; the softness and beauty of this picture are remarkable, while there is a considerable degree of vivacity given to the expression. The portrait of Her Royal Highness the Princess Mary of Cambridge, by one of Caldesi and Montecchi's artists, is very good as a specimen of the application of photography to high art. Whatever miniature painters may say, even though they quote "very high personages in the realm," who lay down the rule that "photography is better than bad art," there can be no doubt whatever but that the miniature painter's "vocation," like that of Othello, "is gone;" for it stands to reason that, if people in these days of rapidity and competition can get a portrait as artistic and as highly finished as ever was produced by the old miniature painters, and for a quarter of the money, they will be sure to avail themselves of the privilege. It must be borne in mind that all miniature painters are not good draughtsmen, and if they paint over photographs, what they lack in drawing is supplied by photography. By the old system of miniature painting, about a score of "sittings" were necessary, and then the likeness often failed; while now, by means of photography, only one sitting of half an hour is necessary, in order to produce the most elaborate and highly finished miniature. To the effect of photography on miniature painting, we may again revert at greater length.

As interesting mementos, Dr. Diamond's frame entitled "Recollections of Our Club," will attract a great deal of attention. The portraits of Dr. Percy, Douglas Jerrold, Charles Knight, Hepworth Dixon, Shirley Brooks, and others, are among them. In conclusion we may just state, that we are at all times glad to hear of the application of photography to any department of science, but we question the taste of exhibiting all the results. We, therefore, are averse to exhibition of such pictures as the "Illustrations of Mental Disease" (597). These photographs ought to adorn the walls of the physician's study, but certainly not the walls of a public exhibition. They are neither interesting as works of art nor as photographs; it is well to know of the application, but we say again we do not want to see all the results. The photographs are perfectly hideous. We must not omit to mention a very pretty view at Harlesden, by Mr. Burke; nor the beautiful copies of pictures which Mr. William Johnson has taken of some pictures in Her Majesty's collection. The pictures which this gentleman has copied are most difficult subjects for photography, owing to the fact that many of them have a yellowish tint caused by accumulated varnishes; but, by clever manipulation, Mr. Johnson has succeeded admirably in obtaining clear definition. It would also be ungallant not to mention the nice little instantaneous pictures by Mrs. Down (289, 290). They are well taken, and in a manner that would do credit to many of our gentlemen photographers.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

Of the Condition of Neutrality of the Bath.—The nitrate of silver baths employed in photography may assume from the point of view of their neutrality three different conditions:—neutral, acid, or alkaline by ammonia. As to the other alkaline bases, they can only restore the bath to a perfect neutrality, without being able, on account of the precipitation of oxide of silver, to communicate to it an alkalinity appreciable in its effects on positive proofs.

If we take as a type a proof prepared on a perfectly neutral nitrate bath, and compare it with another prepared on the same bath, to which we have added 1 per cent. of nitric acid, that is to say, a great excess, we recognise an important difference; the second is redder, the lights are better preserved, while in the first the tone is blacker, and the whites seem to have a greater tendency to darken.

This result agrees with those we have already observed in using acid, neutral or alkaline chlorides; the explanation is the same in both cases, and is based on the influence exercised by the acid liquors on the sizing, which it thus renders more adapted to combination, and, by consequence, to the production of red tones.

The ammoniacal nitrate of silver bath ought to be the object of an especial study on our part. It ought to be prepared in such a way as to contain only just the quantity of ammonia necessary to re-dissolve the oxide of silver which this alkali at first precipitated (it will be seen that this point has been reached, when a drop of soluble chloride added to the liquid yields a precipitate which does not re-dissolve). If, indeed, a great excess of ammonia be added, the bath will dissolve the chloride of silver, in proportion as it is formed on the sheet of paper on its contact with the chloride of sodium, and this, not being clothed, except with a very feeble quantity of argentiferous compound, will only yield a grey and valueless picture.

Prepared under favourable conditions, the ammoniacal bath furnishes the following results on a paper that one places on the surface for two or three seconds only, in order to avoid the washing away of the size. The proof, compared with that prepared on a neutral bath, develops itself in nearly the same time; the tones remain black, but without presenting any superiority over those obtained by ordinary processes.

It is, besides, easy to verify the influence of ammonia in excess. If a sheet of paper be passed in an ammoniacal bath, leaving it there only some seconds, it furnishes a proof such as we have defined; but if the contact be prolonged so as to allow the ammonia to act on the starch to swell it, the result is quite different, and the whole appears tinted a pale red, at the same time that the design loses all vigour and clearness.

Thus the action of an acid or ammoniacal bath may be precisely stated, but nevertheless, in some particular cases, of which the photographer will be the judge, it appears advisable to use nitrate of silver baths that are sensibly neutral.

The nitrate of silver, such as it is found in commerce, presents itself under three conditions—crystallised, white fused, or grey fused, that is to say, up to the commencement of reduction. We have made some experiments with the object of establishing—if certain differences in the result are due to the employment of one or the other of these. We have not observed any salient difference, especially between the two latter; the bath prepared with the crystallised nitrate gave rather redder tones, a result that is easily explained by our preceding observations, since the crystalline nitrate of silver always contains traces of nitric acid: and, consequently, we return to the point from which we set out, *viz.*, the neutrality of the bath.

But this difference is so trifling, that nitrate of silver crystallised from water, and not from nitric acid, may be advantageously employed in positive photography.

Of the Introduction of Foreign Salts in the Nitrate of Silver Bath.—The foreign salts that photographic manipulations may introduce into the silver bath are of two kinds:—the one arises from the double decomposition which takes place between the chloride with which the paper is impregnated, and the silver bath on which it is floated; the second, with the pulp of the paper or the size which covers it.

1. The formation of chloride of silver in the pulp itself of the paper on contact with the nitrate of silver bath, necessarily involves the equivalent production of a nitrate, the base of which is the chloride employed in salting the paper. Thus, when a sheet of paper impregnated with common salt is placed on the silver bath, it gives rise to the

* Continued from page 244.

formation of a nitrate of soda; if the salt of ammonia be employed instead of the common salt, then nitrate of ammonia is formed. It was of interest to examine, in the first place, if the nitrates thus formed remained on the sheet of paper which retained them by capillary attraction, or if they were dissolved in the silver bath; and in the one as in the other case, it was important to establish the influence exercised by these bodies on the *venuė* of the picture.

Experiment has proved to us that the major part of these nitrates remained on the sheet of paper, for in taking a bath which, frequently strengthened with nitrate of silver, had served to prepare a very large number of proofs, and submitting it to analysis, we found in it after removing the silver but 1 per cent. (or thereabouts) of foreign salts. The proportion ought to have been much more considerable, if, in the numerous operations for which it had served, the major part of the alkaline nitrates had not remained on the paper. For the rest, the later proofs prepared on this bath, which, by successive additions of nitrate, had been maintained at a constant strength, in no way differed from the first.

We considered it advisable, however, to ascertain if, in increasing the quantity of these nitrates, the proof might not be influenced, and we found, in forming these proportions, by adding up to 10 per cent. of nitrates of ammonia and soda, these being crystallised or fused, striking differences in the proofs were obtained; the presence of this large quantity of nitrates rendered the proofs less vigorous, and caused them to assume a lighter tint. The effect is especially marked with fused nitrate of soda, a result it is easy to account for from the alkalinity which this salt possesses after its fusion.

In fine, as it appears impossible that under ordinary circumstances of photography a nitrate of silver bath can change itself to this extent with nitrate, a silver bath may be always strengthened, without any fear that the proportion of foreign nitrates which it may acquire can alter the value of the proofs.

2. The salts which the pulp of the paper itself may contain, are too insignificant in quantity for one to suppose them capable of exercising any appreciable action by their dissolution in the bath; but it was of importance to examine if the alum contained in the gelatines employed in sizing was equally innocuous.

Experiment has shown us that this is really the case, and that whether by impregnating the paper, or by adding a certain quantity of this salt to the bath, no difference manifested itself between the proofs prepared under these conditions and those prepared under ordinary circumstances.

(*To be continued.*)

PHOTOGRAPHY IN ALGERIA.

NO. IV. (*continued.*)

I must say that the tale gave me but a very small part of the satisfaction which the natives seemed to derive from listening to it, from which I conclude that the translation was inferior to the original; in fact, I am certain that they are in the habit of seasoning their tales with a kind of salt which is not attic, and which Hamed, out of regard for what he considers my religious prejudices, invariably omits. Some desultory conversation followed, turning chiefly on successful thieving exploits, which one of them delicately termed "a pious fulfilling of the will of Allah;" indeed, stealing from the members of another tribe is regarded as a moral virtue, and a thief exults in his success in proportion to the difficulties he encounters and overcomes in the operation: in short, in such matters, they appear to think that—

> "The simple rule, the good old plan,
> That he should take who has the power,
> And he should keep who can,"

is *the* rule to guide their conduct. I do not know whether my property would have been safe from the predatory assaults of the inhabitants of the douar if I had left it unprotected, but I had no intention of running the risk; besides, it was infinitely preferable to sleep in the wagon, to shutting myself up with a family party, which included the dogs: and Hamed was of the same opinion, for he asked my permission to sleep on his property, which I was not the least unwilling to consent to. We sat chatting for some time after the others had gone to rest, and after awhile we too partly undressed ourselves, and, except the incessant barking of the dogs, the most profound silence reigned, which was suddenly broken by a shrill scream, followed by a succession of others. I was a good deal frightened (it always frightens me to hear a woman scream, and breaks my heart to see her cry), and I gave Hamed a shake, and then ran in to see the cause. I found that the screaming proceeded from the women's apartment, but I knew better than to enter there, and was, therefore, obliged to remain in suspense until Hamed came, for the men, who were lying about in the outer department, went on with their sleeping as if they were angels' whispers which came so shrilly through the canvas partition. In a minute or two Hamed walked in, and, after listening a little, said, it was only ——— administering a "*petite correction*" to one of his wives. I thought the word "*petite*" scarcely indicated the amount of correction, for, judging by the sound, the fellow was "laying on" like a score of Macduffs, and with a disregard of public opinion which was in striking contrast to the delicate susceptibility of the Greek at Constantinople on that point, who, as I read in the *Akhbar* the other day, whenever he had occasion to beat his wife, which was rather frequently, used to fetch an organ-grinder from the street into his room, in order that his neighbours might not have their feelings hurt by hearing her cries. Finding that it really was only the man beating his wife, I did not remain to hear the conclusion.

This method of keeping women in order does not appear to be unusual here; in fact, the Arabs are, in a good many respects, a primitive kind of people, and resort to first principles in this, as well as in many other things.

Our entertainer was extremely anxious that we should remain with him some days; but, as there was nothing in the neighbourhood of sufficient interest to yield me pictures, I refused. I took a portrait of him, and you will be surprised to see how grave and patriarchal a man may look in spite of his indulgence in the amiable weakness referred to above. I had a good deal of difficulty in inducing him to sit, and I am sorry to find that this reluctance is common among the natives now that I have left Algiers, and I am afraid that I shall be unable to get photographs of women anywhere except in garrison towns. Hitherto, Hamed has alleged that his women will not consent to sit, but I have hopes in that quarter still.

I expect to be more successful, in bringing home a larger number of good negatives than any photographer who has yet visited Algeria, inasmuch as I am able to employ the wet collodion process almost invariably. I have made my vehicle perfectly dark, and though it has not the convenience of being lighted by means of yellow glass windows, I get along very well with the light of a lamp. The extreme rapidity of the process is a special advantage where it is interesting to get a group of half savage natives, who would either refuse to sit if they were asked, or, if they did, would want to be paid for it; whereas now, if I see a group round a well—and where there is a well there is almost a certainty of there being a lot of natives about it—the driver stops in the position he is directed, and goes off to get some water for the cattle. In this way I have already taken several pictures, without the natives being in the least conscious of it, and you will see that this in itself is no slight advantage to the appearance of the picture. The exposure requisite is very short; the clearness and brilliancy of the atmosphere being so superior to what you enjoy in England, and the power of the actinic rays being proportionately greater.

There is one thing which I would strongly advise any of your readers who may come out here not to neglect, and that is, a box for carrying the plates which shall secure them from every possible injury. I cannot conceive that there

would be any difficulty in constructing such a box; at all events, I should think the gentleman who has given you the advantages of his experience as a travelling photographer, might design one which would answer the purpose. I have already met with one or two unpleasant accidents in consequence of the boxes containing my plates having been knocked about rather violently, and I am afraid that when I make excursions among the mountains I may suffer still more severely; and only imagine the annoyance, after working for days under such privations in regard to food as nothing but a sincere love of the art could induce one to submit to, of having the result of one's labour destroyed in an instant by the animal carrying them making a false step. I have tried the only means in my power of guarding against this, by making a couple of wooden boxes, with partitions just sufficiently wide apart to allow of the plate sliding down, the back of it being held in close contact with the wood; but I fear that in the event of a tumble this would not prevent some of them from being fractured by the concussion.

I have got one negative which I guard with special care, for on it hangs a tale. I was going to say, it is almost too good to be true, but perhaps that would sound unfeeling; what I mean is, that it seems too singular. The picture is that of a dilapidated-looking building, of rather a large size for this country, standing beside a road; the wood comes down almost close to it, and between it and the building there is a well. The appearance of this building induced me to ask Hamed what it was used for, when he told me that it had formerly been inhabited by a religious body of Mahomedans, to the number of fifty. These devotees, if I may so term them, had the cub of a lion given to them, which they brought up as if it were a dog, and which, though perfectly tame, they kept fastened up by a chain in the courtyard. One day the spirit of his race awoke in him, and he burst his chains and disappeared. They would not have cared much for this if his disappearance had not been followed by the disappearance of sundry members of the flocks and herds of the surrounding douars, and even this they might have resigned themselves to in time, if time had been given them. One evening the chief of the monastery went out to the well to perform his ablutions, it being the custom for him to perform his ablutions alone; but when a more than reasonable time had elapsed for the purpose, and he did not return, he was sought for, but like the young woman whose lamentable fate is recorded in "The Mistletoe Bough," he was not to be found. They resigned themselves to the loss, and another succeeded to his functions, and, sad to relate, the next evening he, too, disappeared under similarly mysterious circumstances; not a trace of him could be discovered: and, to cut a long story short, Hamed said this continued until there were only eleven left, and they, notwithstanding their convictions as to the impossibility of avoiding the decrees of destiny, and the sinfulness of attempting to do so, emigrated in a body to a distant institution, and thus escaped the fate of their brethren, whose disappearance was accounted for in this wise:—The lion had eaten them all; each evening he had seized the first who came out, and carried him off into the wood, probably he knocked him down in the first instance and stunned him, and then took him off to devour at his leisure. Whether this tale is altogether true, is more than I will venture to say, notwithstanding all Hamed's assurances that it is; but I have no doubt there is some foundation for it.

I hope to be able to send you some pictures shortly, for in order to obviate in part the risk of accidents, I have been printing some copies from each of my negatives since I have been here. C. A.

THE ARCHITECTURAL VIEW LENS.

As a mark of his "friendly feeling towards the Photographic Society,"—for which the Society ought to be very grateful —a Mr. Sutton has sent a communication respecting a lens which he terms the "Architectural View Lens." It is composed of two equal and similar achromatic meniscus lenses, placed with their concave sides towards each other, and between them, at equal distances from either, a small concave lens with surfaces of equal radii, with a stop in contact with it. For this combination he claims the merit of being free from distortion; and, in taking pictures of buildings, that it does not incline the vertical line either right or left, while it represents objects in correct perspective; also, that every part of the picture is equally illuminated; that the angular extent of field is only limited by the sharpness of the marginal definition; consequently, by the size of the stop, the chemical and visual foci strictly coinciding. He admits that this combination, being always used with a small stop, is a slow instrument.

It will be seen, from his own showing, that it is only specially adapted for one department of photography, viz., architectural; and we are disposed to think that it may very well be applied to this department, inasmuch as it really is, in all probability, capable of giving pictures of buildings free from distortion; but this is about its only advantage, and is an advantage which it has in common with the patent aplanatic lens, in which the distortion is inappreciable in amount, while it is in every other respect superior.

The disadvantages of this new lens are, its costliness, its great bulk, and its extreme slowness; three drawbacks which will effectually prevent its competing with the best lenses manufactured already.

CASEINE FOR PHOTOGRAPHIC PURPOSES.

BY C. A. SEELEY, ESQ.

AN American contemporary contains the following remarks on the paper by M. Duchochois, on "Caseine," given at p. 183 of the "PHOTOGRAPHIC NEWS":—

"We have repeated some of the experiments of M. Duchochois on caseine, and readily agree with him, that it will prove a valuable material for our purposes. The chief obstacles in the way of its successful use seem to be, the difficulty of preparing it of sufficient purity, and the apparent impossibility of preserving it without change. The pure solution coagulates almost as rapidly as it can be filtered; by the addition of ammonia, however, it may be kept indefinitely. Whether the ammonia has any injurious effect, we are unable to say. Of course, metallic iodides cannot be used as excitants.

"A very speedy method of preparing the ammoniacal solution is, to carefully wash the curd precipitated in sour skimmed milk, and dissolve in water to which a small quantity of ammonia has been added; by filtration, or allowing it to rest, the solution becomes quite clear, and fit for use. A small quantity of lactate of ammonia is the chief impurity. The ordinary method of purifying caseine leaves it insoluble. Besides the uses suggested by M. Duchochois, we have found that caseine makes a good varnish for positives on paper. Will it turn yellow?"

CARBON PRINTING.

WE extract the following from *Cosmos*:—

"Mr. Pouncey, who has caused so much talk during the last half-year, read, at the last meeting of the London Photographic Society, the description of his method of printing positives with carbon; and our readers will be greatly surprised to see that it scarcely differs from M. Testud de Beauregard's process, and that of MM. Salmon and Garnier." (Here follows a description of the process, as given in the "PHOTOGRAPHIC NEWS," p. 213.) "The first positives obtained by Mr. Pouncey left much to be desired, both in respect to half-tones and aerial perspective; his last attempts are much better; but still it cannot yet be said that the carbon reproductions can compete with the positives obtained with the salts of silver."

Lessons on Colouring Photographs.

THE RELATIONS AND HARMONY OF COLOURS.

Before proceeding to the manipulatory details of other modes of using colours, it is important to know something of their relations and contrasts, and of the principles on which harmony is based. This knowledge is a first requisite to the colorist, for, whilst a good eye will sometimes enable him instinctively to produce good results, yet, without some familiarity with the laws which govern harmonious colouring, anything like entire or uniform success cannot be hoped for. Even to imitate the colours of the original satisfactorily, this knowledge is desirable; whilst to produce a picture which shall please and soothe the eye by its judicious arrangement and combination of colour, it is absolutely necessary. The most perfect mechanical skill is comparatively useless without this knowledge, for whilst in colouring portraiture the colorist must imitate as closely as possible the inherent or natural colours of the original, yet as the choice of accessory colours, in draperies and background, &c., depends largely on his taste and judgment, on the judicious management of these he must rely for those contrasts which shall give full value to the inherent colours, and secure at the same time harmony and keeping in the whole.

There are only three simple or primary colours, that is, colours which cannot be produced by compounding other colours, and by the combination of these three, every other possible hue is attainable. These colours are *yellow*, *red*, and *blue*. The source of all colours being solar light, the seven tints of the solar spectrum,—produced by dividing a beam of white light by means of a prism,—were at one time regarded each as elemental colours; very little observation, however, will show that these three only are simple or elemental, the others being produced by the mixture of these three.

By the combination in proper proportions of any two primaries, a *secondary* colour is formed. Thus yellow and red produce *orange;* yellow and blue produce *green;* red and blue produce *purple*. The three primaries and the three secondaries produced by their combination, are regarded as the only six pure or *positive* colours, all subsequent combinations tending to produce neutrality.

The combination of two secondary colours in due proportions produces a *tertiary*. Thus, orange and green produce *citrine;* purple and green produce *olive;* and purple and orange produce *russet*. These have been classed by some amongst the positive colours; but are more usually regarded as the first gradations towards neutrality, and are styled semi-neutrals. These combinations may of course be continued further, without losing precision in nomenclature, although each admixture produces a less definite tint.

The secondary colour formed by any two primaries is what is called *complementary* to the remaining primary; that is, it completes the balance of colour on which harmony depends. Thus the mixture of yellow and red produces orange, which is complementary to the remaining primary, blue. The mixture of yellow and blue gives green, which is complementary to the remaining primary, red. From the mixture of red and blue we obtain purple, which is complementary to the remaining primary, yellow. In like manner, the tertiary formed by the mixture of any two secondaries, is complementary to the remaining secondary. Thus, the combination of orange and green gives, as we have said, citrine, which is complementary to purple. By the mixture of purple and green we obtain olive, which is complementary to orange. The result of a combination of orange and purple is russet, and this is complementary to green. The same principle will apply to every variety of hue produced by combination; for instance, scarlet is red with a very slight admixture of yellow or orange; the complementary green will therefore possess a similar slight admixture of blue, the complementary of orange. Crimson, on the other hand, is red, with a very slight admixture of blue, and the complementary green will in that case incline a little to yellow; and thus in almost infinite gradation.

The combinations of which we have been speaking, it must be observed, are of colour with colour, and the result is in all cases another *hue*, which term applies simply to colour and not to intensity. A *tint* of any hue is obtained by diluting it with white; and a *shade* of any hue by the addition of black. The various gradations of intensity of any hue are termed a *scale*.

White and black are not regarded as colours. Theoretically, white being most nearly allied to light, is supposed to be a combination of all colours; and black as most allied to darkness, is supposed to be a negation, or absence of all colour. Practically, however, the pigments of the painter but very imperfectly represent the pure colours of the solar spectrum, and the compounding of the three elemental colours, each neutralising the other, produces what is termed a normal grey, or a very near approach to black. White and black, therefore, practically constitute the extremes of the neutral colours, and greys their intermediates.

(*To be continued.*)

Photographic Chemistry.

CHEMICAL MANIPULATIONS—(*continued*).

Weighing.—The operation of weighing is simple enough, consisting merely in placing the body to be weighed in one scale, and a suitable weight in the other. In ordinary photographic operations the same nicety in weighing is not required as in chemical researches, where it is necessary to weigh to the thousandth part of a grain. The most useful scales will be a pair such as is used in goldsmiths' shops, which can be taken down and placed in a box, where they occupy little space, and are thus easily transported. The substances to be weighed should never be placed on the scale-pan, but on a piece of paper, a corresponding piece being placed in the opposing scale. In the case of substances, in the weighing of which extreme accuracy is not required, and which are used in rather large quantities, a measure may be substituted for the scale, and thus some trouble may be saved.

Liquids should, as far as possible, be measured in graduated glasses, and resort be only had to weighing them in cases of necessity. These glasses can be bought at any glass-vendor's, and it is far better to buy them than to adopt any of the methods suggested for making them.

The utmost precaution should be taken to keep all the utensils used in the laboratory perfectly clean; and it is therefore advisable to wash all glasses immediately after using them, and to wipe them carefully, not only with linen cloths, but afterwards with blotting-paper, or tissue-paper. If the dregs of the solutions left in them be suffered to dry, there will be considerable difficulty in cleaning them.

Apparatus.—The operator will often find it necessary to use corks with holes drilled through them, in which straight or bent tubes may be fixed. The manner in which these holes are made is by means of a round file. The hole is first made half-way through the cork, which is then turned and the remaining half pierced from the other side, care being taken that they meet exactly in the centre. Some practice will be required before this operation will be accomplished properly. When it is requisite to reduce the size of the cork, it will be better to use a file than a knife, as there is less danger of rendering the surface uneven.

Great care must be observed in fitting in the tube, as pressure in the wrong direction, even if slight, will be almost certain to break the tube, and may possibly very much hurt the operator. To obviate risk from this cause, the hand should grasp the tube close to the cork and insinuate it gradually and on no account violently.

A long glass tube may be easily divided into several of different lengths, by simply filing round the tube at any

given spot, and then breaking it off with the hands. To prevent the ragged end from tearing the cork, it is advisable to heat it in the flame of the spirit lamp until the glass is softened. By the same means any desired curvature may be given to the tube.

Analytical Manipulations are those which are employed to ascertain the nature or purity of substances. They are very delicate, and require great care in performing them. The articles required for use in these operations are by no means expensive, a few test tubes, common watch glasses, a thin plate of platinum, two or three glass rods, a dozen or so of stoppered bottles to hold solutions, such as nitric acid, nitrates of silver, of barytes and ammonia, which are employed as reagents in detecting the impurity of substances, a porcelain capsule, and a spirit lamp. These articles are employed in the following manner:—the watch glasses for receiving the solution it is intended to examine, to which is added, by means of a glass rod, two or three drops of the reagent intended to test its purity. The test tubes are to be used when it is necessary to boil the solutions, and the porcelain capsule when it is desired to evaporate them to dryness. The platinum is used in analyses of substances that volatilise without leaving a residuum, and should, therefore, be kept perfectly clean.

Distilled water must always be used in analytical investigations.

(*To be continued.*)

Dictionary of Photography.

Astro-Photography.—One of the most important and interesting applications of photography is, the delineation of the various celestial bodies, and the recording various astronomical phenomena which are frequently occurring. Photography has already been of great assistance to various departments of astronomy, and the following extract from a letter from the celebrated American astronomer, Mr. W. C. Bond, will be read with interest by our readers, as it gives an account of one of the most recent services which photography has performed for the practical astronomer.

"The near approach of the star *Spica Virginis* to the moon presented a favourable opportunity for testing the practicability of obtaining photographic impressions of a star when in close proximity to the moon, it being a question which has hitherto never been decided, whether the diffused light in the immediate vicinity of the moon would not overpower the actinic effect of the star. Preparations were accordingly made at the observatory of Haward College, for the purpose of deciding this point; and as Messrs. Whippole and Black, the eminent daguerrotypists, to whom we have on former occasions been so much indebted, volunteered their services, a large number of photographic pictures of the moon, and the star in its neighbourhood, were obtained before and after the eclipse: even at the emersion, when the star was in apparent contact with the bright limb of the moon, its image was distinctly formed. The experiment was perfectly successful; pictures of the lunar mountains were impressed on the glass plates by the collodion process simultaneously with that of the star, with minuteness and precision, serving as admirable points from which to measure the distance and position of the star. It is a curious fact worth noticing, that in every instance the impression of the star was, if anything, *too strong*,—the very reverse of which had been anticipated. The possible minimum time of exposure of the plate requisite for obtaining a visible impression of the object upon it could not at that time be ascertained. This is a favourable indication, as the shorter the time required the more accurate will be the result."

Atmosphere.—The whole mass of aeriform fluid surrounding the earth. Photogenic effect is materially dependent upon the state of the atmosphere; and, as it is differently acted upon by natural causes, the variations of this effect are of daily occurrence. These effects are caused by the difference in the density, humidity, and colour of the atmosphere; and perfect photogenic success can only be attained when it is quite clear and free from haze, fog, or a yellow or reddish appearance.

Atomic Theory in chemistry, or the doctrine of *definite proportions*, teaches that all chemical combinations take place between the supposed ultimate particles or *atoms* of bodies; and that these unite, either one atom with one atom, or by *sums* of atoms, which are integral multiples of unity.

Aurotype.—A process of taking photographs upon paper by the agency of gold, the discovery, we think, of Mr. R. Hunt. The process is not of much importance practically. The paper is washed with a solution of chloride of gold and potassium dried, and then washed with a solution of nitrate of silver, and again dried. This paper darkens with rapidity in the sunshine, and fair photographs are the result. The pictures are fixed with hyposulphite of soda. Other preparations of gold produce equally good results.

Axis.—The straight line, real or imaginary, passing through a body, on which it revolves, or may revolve. An *axis*, in geometry, is that line in a plane figure about which it revolves, to produce a solid. The *optic axis* is a particular ray of light from any object which falls perpendicularly upon the eye.

Azote.—The old name for the gaseous element, nitrogen. It is not now used in England, but is still met with in continental works on chemistry; where, also, its derivations *azotic* acid and *azotate* are used instead of *nitric* acid and *nitrate*.

(*To be continued.*)

A Catechism of Photography.

DRY COLLODION.

Q. Can collodion be used *dry* for photographic purposes?

A. Yes. Dry collodion is employed by photographers with much success.

Q. Is its use desirable?

A. It is, on the ground that collodion plates so prepared may be kept for a long time without their sensitiveness being destroyed.

Q. How is this accomplished?

A. By an albumenised mixture of collodion; which, uniting the properties of the two substances—the rapidity of the collodion with the sharpness of the albumen—gives a dry coating capable of retaining its vitality unimpaired for a very considerable period.

Q. Who was the inventor of this process?

A. M. Taupenot.

Q. Is the process successful?

A. It is, as it is easy of manipulation, and gives results of the most exquisite beauty and minutiae.

Q. How may the process be divided?

A. Into eight distinct parts. These are—

1. Cleaning the glass plate.
2. The preparation and application of the collodion.
3. The preparation and application of the albumen.
4. The application of the sensitive coating.
5. The development of the image.
6. Fixing the image.
7. Varnishing the plate.
8. The preservation of the glass so prepared.

CLEANING THE PLATE.

Q. What method is adopted in cleaning the plate?

A. In order to have the glass perfectly clean, the plates must be soaked for some hours in the following solution:—

Common potash	1 part.
Water	15 parts.

The coating of dirt, when the glasses are taken out of the solution, may be removed with a palette knife; after which the plates should be thoroughly rinsed in clear water.

Q. Will the same solution serve more than once?

A. Yes; many times. When the plates are removed from

it—washed, and partially dried—they are ready for the ordinary process of cleaning adopted in collodion manipulation.

Q. How many plates may be cleaned at one time?

A. Certainly not more than a dozen.

Q. Describe the process of cleaning the plates.

A. Place the glass upon a piece of white paper, the side which you intend to make sensitive underneath. Take three pellets of cotton wool; with the first cover your glass with tripoli, thus:—

Tripoli	16 grains.
Water	1 ounce.
Nitric acid	15 drops.

Rub this over the surface of the plate for some seconds; with a second pellet carefully remove the coating of tripoli; with the third finish the drying of the glass. It is necessary that this should be done before the tripoli has time to dry upon the surface of the plate. Having made one side of the glass thoroughly clean, you reverse it on a clean piece of paper, and proceed in a similar way with the other side, completing the polish by the use of a silk handkerchief. The process requires some care, and practice only can give that facility of manipulation which is possessed by experienced photographers. A chamois leather may be substituted for the handkerchief—some operators considering it better than silk.

COLLODION.

Q. What sort of collodion should be used in this process?

A. It is necessary that the collodion should be of a good yielding nature, and very adhesive to the glass. The following is an excellent recipe:—

Ether (60 degrees above proof)	400 parts.
Spirits of wine (40 above proof) ...	100 parts.
Gun cotton	4 parts.
Iodide of ammonium	4 parts.
Bromide of ammonium	1 part.

Q. As the collodion contains so much ether, does it not very rapidly evaporate?

A. It does; and on this account the glass should be covered with it as quickly as possible, so as to have a fine even coating. The best way is to pour the collodion on the middle of the plate, and work it round by turning the plate from side to side; the superfluous quantity may be returned to the bottle.

Q. When the plate is thus coated with the collodion film, what is the next process?

A. When the ether has evaporated, and the surface of the collodion is set, the plate must be dipped into the nitrate bath. This bath is formed of—

Nitrate of silver	7 parts.
Distilled water	100 parts.

The plate may be left in the bath about five minutes; it must then be removed; the excess of solution drained off; and the plate placed in a dish of water; filtered with extreme care. After being washed in this dish, it may be removed to another in a similar manner; then thoroughly rinsed under a filtering fountain; and, being placed at an angle on some good blotting paper, allowed to remain there for about a minute.

ALBUMEN.

Q. How is the albumen prepared for this process?

A. In a graduated glass, place a certain quantity of white of eggs, in proportion to the amount of albumen you intend to make. For instance:—

White of egg	2 ounces.
Distilled water	2 ounces.
Strong solution of ammonia	12 drops.
Iodide of ammonium	10 grains.

Some operators add a little white sugar, in order to give more suppleness to the albumen coating.

Q. How is the albumen to be applied?

A. The collodion plate, having been allowed to dry for about a minute, should be placed on a levelling stand, and as much of the iodised albumen poured over it as it will hold. The superfluous quantity may be returned to the measure; after which the plate should again be covered, and so on for three times; ultimately being drained of the excess of albumen, and stood up against the wall to dry.

Q. How long will it take to dry?

A. Generally about an hour. The face of the plate must, of course, be turned inwards. It should be stood on a pad of blotting paper, and only at one point of its upper edge should it be allowed to touch the wall.

(*To be continued.*)

Correspondence.

PRESERVING NEGATIVES WITH TALC OR GELATINE PAPER.

Sir,—Nearly two years ago I succeeded in transferring a collodion negative on to talc, and printed from it quite as well as if it had been on glass. Finding, however, great difficulty in obtaining the talc in sheets of any size, I put the negative and prints away, and cannot now find them, or I would send them to you. It would be an excellent substitute for glass, and the film is readily made to adhere to it by gumming the surface very smoothly with clear white gum-water, and, when nearly dry, placing the negative on it in the same way I recommended for transferring collodion positives to paper. The face of the negative might be preserved by placing over it a piece of the gelatine paper, and I should prefer making a narrow band of gum-water round the negative, and, when nearly dry, pressing the gelatine paper carefully on to it. It is better than gumming a strip of paper on to the edges, as that causes a slight ridge which would prevent the face touching the sensitive paper. I have tried putting the negative, while wet, on to the gelatine paper, and, with great care, this would answer very well; but if it should not be very closely done, the negative might be spoiled, as it is impossible to separate it afterwards. I think large negatives might easily be preserved between two sheets of gelatine paper. One to be put on to the negative while on the glass, which is very readily done in the following manner:—Coat the plate with transferring varnish, only just thick enough to ensure the film separating from the plate; dry with heat, and, after placing in water, remove the moisture with blotting paper. Then, with a camel hair brush, put on a narrow band of gum-water round the edges, and carefully (when the gum-water has dried a little) place on the sheet of gelatine paper, press slightly till quite dry, and take up the film from one corner, when the whole can readily be lifted from the plate. Then preserve the back by another sheet of the gelatine paper, placed on in the same way. By this means the negative will be perfectly protected, and if the gelatine paper should get scratched, a fresh sheet can be put on, as the other can be removed by passing hot water with a brush over the adherent portion.—I remain, dear sir, yours truly, THOMAS BARRETT.

Reigate.

PHOTOGLYPHIC ENGRAVING.

Sir,—I have been trying Mr. Fox Talbot's photoglyphic process as detailed by you at page 73 of the "News," but have utterly failed; is it that there is something omitted in the details given?

1st.—I have found it very difficult to spread the solution of gelatine and bichromate of potassa on the zinc plates, and only succeeded by immersing them for a moment in water, and draining them previously.

2nd.—The heat of a spirit lamp made the coating boil and blister. This I tried to obviate by drying the plates before a fire. This gave me a coating something like what is seen on crystallized tin: all in waves, but nothing of the prismatic bands mentioned.

3rd.—After exposing under a glass negative no change whatever appeared, nor any trace of a picture, though I tried several experiments, exposing from two to thirty-five minutes.

4th.—The solution of perchloride of iron did not appear to act at all, at least very slightly, and nothing like a picture resulted.

I made all the solutions myself, just as detailed in the "NEWS." The peroxide of iron I made by exposing sulphate of iron to a strong heat in a crucible. This I dissolved in hydrochloric acid, and evaporated to a syrupy consistence.

Now, sir, I cannot understand the cause of my failure, and shall feel obliged by any information you can afford me through the "NEWS."

If I had produced any etching, however bad or imperfect, I should not have written to you, but would have continued my trials till I succeeded, but having so completely failed induces me now to apply for further advice.

Carlow, Ireland. M. M. D.

Photographic Societies.

LONDON PHOTOGRAPHIC SOCIETY.

THE anniversary meeting of this Society was held on Tuesday last, the Lord Chief Baron Pollock in the chair.

After the usual routine business had been disposed of, the President rose and addressed the meeting at considerable length. He lamented that there had been no important discovery in photography during the past year on which he could have the pleasure of dwelling. He referred briefly to what had been done in carbon printing, and dwelt on the fact that attempts which had been made to repeat the experiment made by M. Niépce de St. Victor in storing up light had been unsuccessful, and suggested that this must have arisen from the experiments having been made under less favourable conditions than those under which the distinguished foreigner referred to had succeeded. He next referred to the present exhibition of photographs, which he pronounced to be the best held hitherto, and spoke of the interest with which the Prince Consort had regarded the pictures exhibited on the occasion of seeing them in his company. He regretted to inform the meeting that the financial condition of the Society was not very flourishing, forty-five pounds having been lost by the exhibition at Kensington, and a further sum of seventy pounds by the supplementary exhibition at the Society's Rooms, so that the expenditure of the Society during the past year had exceeded the receipts by fifty-five pounds; but he did not conceive it would be necessary for him to announce—as the Chancellor of the Exchequer would do under similar circumstances—that any additional tax should be levied on the members, especially as there was every prospect of the present exhibition being a profitable one. In the course of his address the learned President alluded to a theory, propounded by Mr. Grove at a meeting of the Royal Institution, on the subject of light, which that gentleman conceived might bear the same relation to gas that gas bears to liquid, and expressed an opinion that that theory was without foundation, and that in his opinion the vibratory theory was the correct one; and that, moreover, if any important discovery with respect to the nature of light were made, it would be by means of photography. The speech of the distinguished President, which was characterised by much ability and no little humour, was received with considerable applause; and, perhaps, this may be the place to remark that the calmness and impartiality of the President may well be observed as an example by the occupant of the chair, whoever he may be, between this and the next annual meeting.

The address of the President was followed by the reading of the report by the Secretary, in which the fact as to the financial condition of the Society embodied in the speech of the President was dwelt upon at some greater length; and great stress was laid upon the impartial (?) manner in which the journal of the Society was conducted.

Upon the Secretary resuming his seat, Mr. Bishop rose to object to the reception of the report until the members had received a detailed statement of the manner in which their money had been disposed of. He complained that the members were kept in entire ignorance of the proceedings of the council, and that, practically, they had no share in the management of their own affairs. He also referred to the promise that had been made, that an amended form of rules should be drawn up, a promise made a long time ago, but which had never yet been fulfilled; and expressed a hope that Mr. Foster, who at that time was an ardent advocate for the revision, should not, now that he was elected a member of the council, forget—like a good many individuals under similar circumstances—now he was in office, the opinions he had expressed when he was out of office. He commented on the announcement that the council of the Society was about to apply for an injunction against a journal for assuming a similar title to its own, and expressed an opinion that, in the event of their doing so, the bill would be dismissed with costs, and then the Society would not only have to pay its own costs in the matter, but also that of its opponents, which would probably amount altogether to some hundreds of pounds. He concluded by putting the question to the President whether or not a bill had been filed in chancery. Previous to this, however, he complained that the council should have thought proper to enter into such an expensive matter without first ascertaining the wishes of the members of the Society. The speech of Mr. Bishop was received with marks of approval from the majority of the members present.

In reply, the President expressed his belief that no application on the subject had yet been made in the court of chancery; but he would not allow that the council ought first to take the opinion of the Society before acting for its benefit. With respect to the statement of account asked for by Mr. Bishop, he admitted the right of that gentleman to ask for it; and advised him, if he were not satisfied, to move that the adoption of the report be adjourned until the next meeting.

This suggestion was adopted by Mr. Bishop, who moved accordingly, and his motion was seconded by a gentleman, who showed his consistency, when the question was put to the meeting by the President, by refraining from voting; and when this motion had been rejected on a show of hands, and the affirmative motion was put to the meeting, viz., that the report should be adopted, by voting in that sense.

Mr. Malone then rose to object to the reception of that paragraph of the report which referred to the impartiality, &c. of the manner in which the Journal was conducted. He complained that the reports in it of what was said at the meetings were extremely erroneous; that statements were imputed to him in it which he had never uttered, but the very reverse of what he really did say. He likewise considered that the supplementary number published each month was calculated to injure the sale of the Journal from the nature of its contents, and was proceeding to strengthen his statements when—Mr. Fenton rose, and, in a rather cavalier manner, interrupted him by remarking that he, Mr. Malone, could not have paid attention to what had been read, or he would not have made the remarks he had. Mr. Malone was about to justify himself, when he was told by the President that he was out of order in speaking a second time on the same subject; upon which Mr. Hughes rose in support of Mr. Malone, and reiterated what that gentleman had stated with respect to the inaccurate manner in which the reports of what was said at the meetings were published in the Journal; and quoted an absurd statement which was attributed to him, and which should have been corrected by the editor, even if it had been made by the reporter,—a fact which the subsequent discussion rendered somewhat doubtful. As a remedy for this, Mr. Malone suggested that the manuscript report should be sent to each of the speakers to be corrected by him; but no resolution was come to on the subject.

Mr. Bishop again rose, and in reference to the statement contained in the report relative to the impartiality with which the Journal was conducted, remarked in sarcastic terms on an article published in it attacking the "PHOTOGRAPHIC NEWS," and expressed his satisfaction that the council had not since committed itself in any such discreditable manner. He made some further remarks in praise of this journal, which were received with applause by many of the members present.

The election of the officers for the ensuing year was next proceeded with, but the impatience of the greater part of the members to be gone was such as to make them forget the respect due to the learned gentleman who does them the

honour to preside over the Society; and it was only on Mr. Bishop rising to remind them of what was due to the chair, that they were recalled to a sense of decency. The proceedings were concluded by the last-named gentleman paying a well-merited tribute to the able and impartial manner in which the President had conducted the business of the evening, and an expression of his regret that, in consequence of his more important avocations, he, the President, was prevented from attending the meetings oftener than once a year. He moved the thanks of the meeting to him, which motion was warmly applauded by the members who still remained; and the President, after returning thanks, announced that the next meeting would be held on the first Tuesday in March next.

North London Photographic Association.

At the last meeting of this association a paper was read by Mr. Legg, "On the Delineation of Microscopic Objects by Photography with Artificial Light." This paper was illustrated with the apparatus employed: it consisted of a long board on which were arranged the camera with microscope adjusted to it (as described at p. 4 of the "Photographic News"), the source of light, and condensing lenses. The only novelty which the author professed to introduce was, the arrangement of the condenser: this consisted of two bull's-eye lenses of respectively one and two inches diameter, placed near a small camphine lamp, in such a manner that the rays of light from it were condensed and rendered parallel; no advantage was obtained by concentrating the rays upon the object by any further lenses, &c. The photographic process employed was ordinary wet collodion, developed first with sulphate of iron, and afterwards intensified with pyrogallic acid. The times of exposure varied from three to ten minutes. With respect to the best method of adjusting for the difference of the visual and chemical foci, Mr. Legg stated that he had lately added to some of his object glasses of long focus a lens of low power, which effectually corrected the focus without any further adjustment.

The chairman, Mr. W. Hislop, stated that in his opinion the best plan was to take a negative of about one inch in diameter, and afterwards enlarge from that. He also approved of the method of correcting the difference of chemical and visual foci of the microscopic object glass, by adding to it a common spectacle glass. He kept several of these lenses by him, of from three to thirty inches focus, and, by a few experiments, he found the one which was best suited to any particular object glass.

Mr. Hannaford then brought forward some improvements which he had made in the iron printing process, described in the "Photographic News," p. 239. He stated that he had substituted albumen for the gum arabic, and found it much superior. He used albumen with either once or twice its bulk of water added to it, and well beaten up in the usual manner. This was saturated with bichromate of potassa and a certain quantity of ammonio-citrate of iron was added to it; this varied according to the strength of the negative, being ten to fifteen grains for those which had strong contrasts, fifteen to twenty grains for good negatives, and twenty to thirty if they were faint and over exposed. The author took thick French paper albumenised as for the ordinary printing process; this was floated for two or three minutes on the above solution, and then hung up to dry. When dry the sheet was exposed under a negative in the usual way, but Mr. Hannaford omitted to give any idea of the time which was requisite for this operation, or the appearance which the sheet should assume when it had been exposed sufficiently. After exposure it was to be washed for not less than half an hour, but as much longer as convenient; it was then ready to be transferred to a bath prepared with liquor ammoniæ, one ounce; water, one pint; in which it should remain for about five minutes; this had the effect of clearing the white parts of the picture; then, after rinsing in water, it was placed in a solution of one grain of chloride of gold in four ounces of water, in which it must remain for five or ten minutes, after which it will be ready for the developing operation. This was effected by pouring over it a saturated solution of gallic acid, and when the details were sufficiently out it was to be washed once in boiling water. In case of over exposure the gallic acid might not bring out the details sufficiently; in such a case a little of the ammonia solution poured over would have an almost magical effect.

Miscellaneous.

Parisian Photography.—A revolution has taken place here in the department of photography. Hitherto, when great artists, painters, or sculptors have been spoken to upon the subject, the answer has always been—"Photography will be nothing in an artistic sense till some real artist devotes himself to it;" and it was usually added, "No great artist will do that." The real artists, it was supposed, would devote themselves to sculpture, or painting, or engraving, but would not descend to what was regarded as a purely manual process. What has been the consequence? The photographers of France have been either rich men, like M. Aguado, who liked to draw ready-made drawings without the trouble of learning to draw, or men who, like the Parisian homœopathists, fancy they can practice homœopathy without knowing anything of medicine. The merely mechanical part of photography has been until now exclusively thought of, and it has not been understood that the sun's rays might be, as it were, guided and used like a brush. A man, whose name stands high in the arts here, has within a very short time turned his attention to photography as an art. In 1848, even in the very midst of the revolution, all Paris was struck with admiration at a certain medallion, and afterwards at a bust of Lamartine, copies whereof were exhibited at every turn. The sculptor, Adam Salomon, soon rose to celebrity, and his subsequent works have only gone on confirming his just renown. His is the famous Charlotte Corday, which is as familiar to every contemporary eye in Europe as were, sixty years ago, the heads of Roman heroes of the school of David. Adam Salomon is a genuine artist, as those of the sixteenth century understood the word. He abominates mere specialities, and holds that art is everywhere—in the mounting of a bracelet to the full as much as in a triumphal arch. His cameos and enamels were *chefs-d'œuvre*. Now he has taken to photography, and anything so wonderful as the effects he produces it is hard to conceive. He really does, as I said before, use the sun's rays as a brush, and paints with them. The consequence is, that his photographs are not "reproductions;" they are pictures. The finest engraving in the world is not preferable, in an artistic sense, to these portraits I speak of, and the merit of exact resemblance is of course there in all its superiority. A whole day nearly may be spent in Adam Salomon's studio, looking over his gallery of modern celebrities. Here, again, you find another Lamartine, that is as full of art as though painted by Jaques or Rossini, to place by the side of no matter what picture; and a long list of others, too numerous to set down. It is all but incredible the reality of the thing before you, united to the merit of it as a work of art. A few days since, the famous Nadar—the man who "does" the photography of the whole world—went to see this gallery. At the first inspection he was quite taken aback, and murmured, "Yes! this is the last expression of photography!" but a few minutes after he added, as though speaking to himself, "Ah! bah! I don't care—it will not hurt me." And Nadar was right. The crowd is everywhere unartistic, and nowhere more so than here; and the million will flock to the mere mechanic, who "does" Cousin or Villemain indifferently, with his tailor or *porteur d'eau*—and the *élite* only will apply to the real artist, who forces the sun to paint a picture.—*The Literary Gazette.*

Micro-Photography.—M. H. Garbanati writes as follows:—I was recently handed two small pieces of glass, in the centre of one of which, by dint of close and painful examination, I discovered a speck about one-sixteenth of an inch in diameter, which bore somewhat the resemblance to a portrait of a head; in the other was also a speck about one-eighth of an inch in diameter, but which I could not recognise as any particular object. By holding the first piece of glass up to the light, and looking through a powerful magnifier, I discovered a perfect portrait, and in the other a group of five portraits equally perfect. To what use might not this mode of photographing be put! In war the most elaborate instructions might be carried in a button or the head of a pencil case, and the general or secretary of war needs but a magnifying glass to save the use of spies, and men from hanging; the whole archives of a nation might be packed away in a snuff-box. Had the art been known in the time of Omar, the destruction of the Alexandrian library would not have been a final loss.

Photographic Notes and Queries.

SINGLE AND DOUBLE LENSES FOR LANDSCAPE PHOTOGRAPHY.—DEAD BLACK FOR BRASSWORK.

SIR,—I am obliged to you for your answer to my query respecting the relative advantages of double and single lenses. My question, however, was prompted by your reply to one "Chirurgus," at p. 72, in which you say:—"A portrait lens should have small stops to fit in front of the first lens, and it will then do for views, although not quite so well as a proper view lens." Now I have for more than five years used a double combination for views—both large and stereoscopic—but I have always placed the stop *between* the lenses. My largest has a focus of nine and a half inches, and with this I make pictures 10 × 8, which are in perfect focus throughout. With this lens I have never experienced the centralisation of light which you mention; but I have experienced it with the stereoscopic lenses, whenever I have attempted to take a view with the sun-rays at an angle of, say 35° or even 40°, with the direction of the camera. But I conceive that a stop in front, in addition to the stop in the middle, would obviate this, as it does with the view lens. The late Mr. Archer was, if not the first, *one* of the first to use the stop between the lenses. The chief objections to view lenses in my eyes are the limited angle of view, the longer focus, and the destruction of the parallelism of the vertical lines. They make buildings at the sides of the picture converge to a point outside the top of the picture.

My reason for putting the question to you was, that I imagined there must be some advantage in view lenses with which I was unacquainted.

You ask in a former number for a recipe for producing the dead black surface on brass, such as is on diaphragm plates of microscopes. I believe that opticians have only two modes of producing a black surface, and one of these is by means of chloride of platinum: you first clean the brass so as to free it from all grease, with the finest emery paper, and immediately slightly warm it and lay on the chloride of platinum with a camel-hair brush; you may then put a thin coat of lacquer over it.

The dead black is produced in the inside of camera or microscope tubes by applying to the heated brass, with a brush, lacquer in which has been mixed some lampblack. The lampblack should be well mixed, by grinding it up with a little lacquer on a slab or piece of glass. The lacquer should not be too thick. The brass should be heated to about the temperature of boiling water.

The best lacquer is made by simply melting shell-lac in spirits of wine, without heat; when dissolved, pour off the clear liquor for use.

For small work, the workmen, I believe, make their own lampblack, by holding, contemporaneously, a piece of brass or tin over a gas flame. It is then free from grease and very fine.

The brighter black surface, like enamel, on the end of eye-pieces of microscopes next the eye, is produced by the same process, but the surface is afterwards smoothed, and then lacquered. H. E. N.

COLOURING GLASS POSITIVES FOR THE MAGIC LANTERN.

SIR,—Not one of the least interesting and instructive applications of photography, is the easy production by its valuable aid of slides for the magic lantern. In place of the florid, uncouth, ugly daubs, with which the youth at our christmas parties, missionary meetings, and astronomical lectures were wont to be regaled, they now have lovely and faithful delineations of nature, sketched and shaded by the glorious sun. But, as if to leave a little credit to be gained by mortals, we are allowed to colour those matchless pictures ourselves. How to accomplish this properly, so as to keep all the delicacy and detail of the positive, is a secret, the knowledge of which I should prize highly, especially as I have tried my hand already without much success.

I obtained my glass pictures from good negatives by transmitted light, by the same process as that mentioned in a recent number of your valuable journal. I used a single gas jet, intensified by having a silver reflector behind, the negative being next the light, and the sensitised plate nearly in contact with it. Ten seconds is sufficient to give admirable pictures, which, on being treated with chloride of gold after development, became beautifully transparent. Here, however, my success terminated, and my difficulties began.

Having provided myself with a box of water colours for glass painting, I found the utmost difficulty in causing them to adhere to the varnished surface. Not, I believe, from any fault in the pigments, but from my own inability to apply them. Ultimately I succeeded in producing a slide which showed pretty well on the white screen, but it was totally devoid of delicacy in detail and depth of colour; the picture having materially suffered, as I thought, from the accumulated coats of varnish.

I believe a few practical instructions in this description of colouring would be of vast service to many artistically inclined individuals located in country districts, among whom no one would feel more obliged for a few hints than, yours respectfully, WILLIAM COCHRAN.

Glasgow.

WASHING POSITIVE PRINTS.

SIR,—I have just had made and registered a bath for washing prints rapidly, by letting a stream of water flow on them for half an hour, when any print (as is well known) will be found sufficiently washed. There have been a great many contrivances of late for this purpose, but none to my mind so simple as the one I am now writing about. The bath is made of deal, in the shape of a trough, standing on four legs, about two to three inches in height, according to the size of the trough. The bottom of the trough is perforated with holes; *inside* this trough I put either a porcelain or pewter *inner trough*, with a top to it, which, with the bottom, is also perforated with holes. The prints are put within the porcelain or pewter trough, and the whole placed under a sink, to the cock of which I hang on a long wooden pipe, of the form of those used for pouring the water from the pump into the water cart. Of course the water runs through this "gutter" (I will call it) on the perforated china pan inside the wooden one, and empties itself from the bottom, so that there is continual running of water for as long a time as is wished. My object in having the top perforated is to scatter the water without its coming heavily in one place, which so often hurts the print by creasing, &c. A sliding top shuts up the whole affair when done with, and makes a capital packing case for carrying one's apparatus about in when travelling. I have also invented a new tent, very small and portable, for changing the plates in the dry process in the open air. I have now practised photography for some years, and shall be only too happy if I can add to it some convenient and improved apparatus.

A PRACTICAL AND HARD-WORKING AMATEUR.

[We shall be very happy to receive a description of our correspondent's improved tent.—ED.]

GLAZE FOR COLOURED STEREOGRAMS.

SIR,—Can any of your correspondents inform me of the best mode to pursue in varnishing or glazing coloured stereoscopic slides?

I have, I flatter myself, coloured them well, but must confess that the varnishing process has hitherto defied all my efforts to produce a good, clear, even-varnished surface. The *modus operandi* in my hands has resulted in removing the colour, on applying varnish, gum, or indeed anything calculated to give a gloss. Your superior knowledge is invoked to help a poor fellow over the style.

A SUBSCRIBER.

BLACK VARNISH—COLLODION POSITIVES ON BLACK PAPER.

Sir,—I can recommend the following receipt for a good dead black, to answer almost any purpose where a dead black is required:—Take as much drop black as you think will be sufficient for the work you intend to do, grind it with turpentine, then add as much japanner's gold-size as will bind it fast; any house or coach painter will prepare it for you.

Process for taking Positive Photographs on Paper, Direct in the Camera.—Take any kind of smooth paper, give it three coats of black japan, let it dry and harden a day or two, then procure some pumicestone, grind it very fine in water, same as grinding paint, then take a piece of fine cloth and rub the surface of the japanned paper with the pumicestone until you have a fine surface; it is then ready for use. Float the paper plain side down on a dish of water, let it drain a moment or two, then lay it on a piece of glass, a little larger than the paper, then proceed to pour on the collodion and manipulate the same as on glass. The collodion should be a little thicker than for glass, and it requires a little longer exposure in the camera. I can take them on paper equal to those on glass. E. R.

SYNOPSIS OF PHOTOGRAPHIC PROCESSES.—COLLODION ALBUMEN.

Clean plates.
Coat with collodion; let well set.
Place in bath 1′; get rid of oiliness.
Wash well.
Drain 1′.
Pour albumen on and off several times.
Dry; not by artificial heat.
Place in bath 1′ to 3′, soon before use.
Dry; not by artificial heat.
Expose.
Moisten with water.
Develop.
Wash in a little common water.
Fix.
Wash in abundance of distilled water. H. S. I.

ANSWERS TO MINOR QUERIES.

Supporting large Glass Plates.—*W. Dickson.* We do not much like *plate-holders* for this purpose; those in which the plate is held by a screw are very clumsy, and the pneumatic plate-holders (according to our experience) generally let the plate drop just at the critical moment. The plan we prefer is, to hold one corner of the plate by the finger or thumb in the ordinary way, and then rest the opposite corner on the edge of a table or similar convenient support. By this means all the usual alterations in position may be made without the least inconvenience, and without its being necessary to remove the corner from the support. Another plan which we have found useful is, to place a stone-ware bottle, holding about a gallon, on the table, fit a cork tightly into the mouth so as to allow part to project, and then, having the bottle half full of water to give it steadiness, support the plate in a convenient spot near the centre on the cork, still holding it by one corner as usual.

Poisonous Effects of Cyanide of Potassium.—*An Amateur.* The ordinary positive developing solution made with protosulphate of iron, is the best antidote to the poisonous effects of this salt. If necessary, it may be taken internally without danger (unless other substances of a deleterious nature have been added to it, such as nitrate of baryta in excess, or perchloride of mercury), or it may be applied externally to a wound, if cyanide of potassium has got into it. The presence of a little nitric or acetic acid is of no consequence.

Candle Light in the Dark Room.—*E. H.* You may, without fear, have your dark room illuminated with a candle, unprotected with yellow paper or glass; remember not to have the light within two yards of the plate, if a rushlight or common dip; or within three yards of it if it be a wax or composite candle. Be very careful, also, not to allow the vapour of collodion to approach the light, as it is very inflammable.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

We must beg our correspondents not to send glass plates through the post, except they are securely protected against breakage.

T. C.—1. Telescopic object-glasses are far more expensive than Photographic lenses of the same size, but we cannot tell you the exact price, as they vary with each maker. 2. In *front* of the lens as stated.

Delta.—1. We cannot suggest any other plan than those you name; all methods of preventing passers-by seeing through your glass window will diminish the light. 2. We have used the paper you mention very successfully, but know nothing much about its mode of preparation.

W. L. C.—1 and 2. See our Dictionary in the last number. 3. See p. 180. 4. We are sorry we cannot suggest any better plan than the one which you have described.

Piscator, Cape of Good Hope.—1. The postage is 1d. each copy; we shall therefore send the "Photographic News" weekly. The cash sent will pay to No 30 inclusive. 2. The price for stereoscopic negatives varies from half-a-guinea to five guineas, or more.

A. D., Broad-street.—Photography by Lake Price.

J. B., Notting Hill.—We are sorry for your case, but can hardly venture to advise upon such a matter; your best plan will be to apply to some well-known photographer and colorist, with whom you might possibly come to some arrangement

J. C.—The best strength must be found out by experience.

A Struggler.—1. It is usually the case that in endeavouring to make a lens applicable to both purposes, they succeed in neither. 2. Un-iodized collodion will answer better for a cut than solution of gutta percha.

T. T.—1. We cannot suggest a better plan for your glass room than the one you propose. The light would be very good, and would, of course, require to be subdued with blinds if the sun were shining. 2. Enamelled iron tablets, if good, may be used exactly as glass plates in taking collodion positives. The same chemicals and exposure will be required. 3. We hope to give a full description in a short time.

Stereo.—Professor Wheatstone was the inventor of the stereoscope.

Libel.—1. Place the vignette glass *outside* the glass of the pressure frame; thus, both it and the negative will be safe from breakage. 2. The collodio-albumen process, as described in recent numbers of the "Photographic News," is the best of all. 3. Apply the shell-lac varnish warm, and slightly heat the plate whilst drying.

Perseverance.—The fault is in the toning process. Try the one given at p. 86.

G. J. Jones.—1 and 2 have been already answered in recent numbers. 3. We expect to give a description of the best *instantaneous movement* yet out in an early number.

Chemicus.—We have cases for preserving the numbers of the "Photographic News" at 1s. 6d. each, post free, 1s. 8d.

H. S. I.—1. Use an old red collodion, and you will easily obtain as much absence of half-tint as you want. On the other hand, to obtain more half-tints in your stereograms (which *are* rather snowy), use a nearly colourless cadmium collodion, and expose longer in the camera. 2. We are obliged for your hint, and will proceed to carry it out; we hope to be able to give a much fuller table than the one you have favoured us with. 3. Fully explained at p. 240.

A Photographer of some Standing.—The suggestion is received with thanks.

A Visitor in Ryde.—Received.

C. E. C., Cornwall.—Good clean corks may be advantageously used for the collodion developing and fixing solutions instead of glass stoppers; but the latter must be used for silver solutions, as organic matter will be likely to decompose the nitrate of silver.

J. O. E.—Your suggestion is ingenious, but impracticable.

Not up to the Mark.—1. The cause of gold-coloured stains on albumen paper is fully explained at p. 59. 2. You can obtain greater softness in your pictures by exposing rather longer, or by adding one grain of bromide of cadmium to the ounce of collodion.

B. H.—We are obliged for your suggestion, and will bring the subject before our readers as soon as we have given it further consideration.

A Welsh Amateur.—The nitrate of silver was reduced to the metallic state by the organic matter forming the cement with which the glass bath was joined.

J. D. C. O. E.—You should have no stop with a double lens if you wish to take very rapid pictures. We shall be very pleased to receive a description of the piece of apparatus you name.

J. Grant.—Your picture arrived so completely smashed, that we were not able to examine it very well. We should, however, recommend the collodio-albumen process.

F. L. G.—1. We do not much like the negative printing process. You will be able to obtain the tint you require by the process given at p. 86. 2. A twin lens camera.

Mo. Ct.—Your pictures of Ramsgate and Margate are very excellent.

F. H.—We will see if we can organise some such plan as the one you suggest.

Communications declined with thanks:—Old Phos.—P. L.—X. A. F.—C. P.—Hypo.—One Month.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Williams.—E. S.—F. A. D.—L. T. C.—G. L. A.—C. W.—T. O.—Turk.—100.—A Photoglyph (see this number).—Thompson (no).—Glass.

In Type:—T. W. H.—M. D.—W. R. S.—X.—D.—G. E.—J. S.—V.—H. S. I.—T. B.—F. P.—J. W. W.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., NO. 23.—*February* 11, 1859.

PHOTOGRAPHY IN WESTERN INDIA.

WHILE we read in the home papers of such triumphs in photography as a likeness of Mr. Charles Dickens so exquisitely minute that its beauty and fidelity are only discovered by the use of a powerful microscope, and of a whole family portrait gallery being inclosed in a signet ring worn by the Queen, it is gratifying to be able to record that the practitioners of this useful and interesting art are, in this country of our temporary adoption, giving unquestionable proofs of steady progress. We have before us Nos. 18 and 19 of *The Indian Amateurs' Photographic Album*, published monthly under the patronage of the Bombay Photographic Society; and we must say that the specimens reflect immense credit upon the artists engaged in their production. The labours of the local Society to preserve, by this delightful process, the memory of Indian antiquities, which are fast crumbling into decay and mere oblivion, have not been commenced a day too soon. What would "Old Mortality" not have given for the use of such an art as photography? which would have rendered his researches through ancient graveyards a hundredfold more easy in the process, and satisfactory in the result! What a happy man would John Britton have been, had his long and arduous labours been lightened by this inestimable auxiliary, when he was preparing his famous work on "Cathedral Antiquities!" And how thankful should cotemporary archæologists and ecclesiologists be, that their lot has been cast in days so much more propitious for the pursuit of their favourite studies!

The representation in the collection before us of the entrance to the Monolithic Temple of Kailas at Elora, photographed by J. N. S., is a good example of what can be done by this art to rescue from "the tooth of time and razure of oblivion" the monuments which abound in India of past greatness, and a zealous though deluded and misdirected piety. By the observations that accompany this work, we are reminded that the religious excavations at Elora are the most famous in Western India, not only on account of their number, magnitude, and excellent workmanship, but because of the variety of the forms and uses of their several groups, devoted respectively to Budhist, Brahmanical, and Jaina religions. Dr. Wilson tells us that the Budhist excavations were formed about the Christian era, and the Brahmanical probably about A.D. 917; and that from an inscription still readable, the Jaina excavations are not 700 years old. The temple of Kailas—the entrance to which is photographed with great effect—was dedicated to the Brahmanical god Shiva, after whose heaven it is named. "It consists not merely of excavated apartments with mythological and ornamental figures, but of a roof with towers and steeples, all cut out of the solid rock. It is surrounded with minor temples, in which almost all the deities of modern Hinduism are represented." And finally, we are told, rather unnecessarily, that "the workmanship is much superior to anything now executed by the natives of this country." Vestiges, like these, of past grandeur and glory, are suggestive of serious reflections, and, next to a personal examination of them, perhaps the best aid to our thoughts is the perusal of the faithful and clearly defined lines in a photograph like that before us.

In the same part of the *Album*, there is quite a different pile represented, albeit also a temple—that of Dhakaleshwar at Breach Candy, the pyramidal tower of which is familiar to many of our readers. It, too, fully confirms the remark about the inferiority of modern to ancient workmanship in this country. This religious edifice was built by Dhakaji Dadaji, Esq., a late citizen of Bombay; and it has had the misfortune to fall into neglect before falling into decay, for it still seems to be in *pucka* condition. Although its ambitious founder united the name of the deity with his own in the title he gave to the temple, it never has been popular; it is seldom visited, and even its annual festival attracts few worshippers.

We come now to another scene, in which the objects represented are not architectural fabrics, ancient or modern, but flesh and blood, although like the former associated with a benighted faith—we mean the portraits of a well-known Hindoo controversialist, the Brahmachari Bawa, Vishnu Bhiku, and one of his disciples.

The following description of this famous theological debater accompanies the photograph:—

"Vishnu Bhiku, well-known of late in Bombay as 'The Bawa,' is by birth a Brahman. He is said to have been an official in a government office before he commenced the practice of the gentle religious austerities which he now observes, especially in the matter of dress. A few years ago he appeared as a religious disputant and instructor at Kolapoor. He commenced his public labours at Bombay in 1856. 'He challenged all the world, and missionaries especially,' says the Rev. Mr. Bowen, 'to discuss with him the relative merits of Hinduism and Christianity.' But he showed no disposition to encounter them on equitable terms of debate. An invitation to do this, which was addressed to him, he, in fact, either neglected or declined. After his discourses at the sea shore—which continued from the 15th January to the setting in of the monsoon of last year—he usually allowed some of the missionaries of Bombay to reply to his remarks, and proceeded to hold with them very keen discussions. Mr. Bowen, in particular, vigorously exposed his representations and reasonings, of which he has furnished a correct report in a little volume entitled, 'Discussions by the Sea-Side.' The Bawa, of late, has been very quiet in the community; and report has it that he is writing a book which will be a better test of his powers than any verbal addresses which he has yet delivered. As he has been so kind as to sit before us for his picture, we leave the public to form its own opinion of his marked physiognomy. His shirt is that generally worn by Sanyashis. His pots and staff and unostentatious turban complete his equipments. One of his disciples, a well-known Sonar in Bombay, is sitting on the ground before him, but he seems more occupied with his *granth* than with his *guru*."

On the part of the public thus invited to do that which delicacy prevented the photographer from doing, we have no hesitation in saying that the features and forehead of this Hindoo orator would not have been despised by Lavater and Spurzheim, when looking or feeling for intellectual capacity and energy. With a bright eye (which might be of great help to an eloquent tongue), a well formed mouth, and lofty *os frontis*, the effect of the whole countenance is grave and impressive, if not commanding. The Bawa, with all his religious austerities, may have had some little pride when he brought to the artist's studio the companion, who is squatted on the floor, for we must say that the wrinkled features, sunken eye, receding forehead, and mis-shapen person of the disciple make an admirable foil to the face and figure of his master.

We have no room at present to notice the contents of Part 19. They are also exceedingly well executed, and consist of "The Fort of Bombay, from the Apollo Bunder," by W. Johnston; "The Native Knife-Grinder and his Assistant," by the same artist; and "St. Mary's Church, Poona," from

a collodion negative by Henry Hinton. We may return to these should opportunity permit, but meanwhile we recommend this spirited and well-conducted undertaking to the cordial support of our readers.—*Bombay Gazette.*

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

Of Organic Substances dissolved in the Bath.—It is certain *à priori* that every sheet of paper floated on the silver bath yields to it, through dissolution, a portion of the size which covers it, whether that used in the manufacture, or that added: the effects of it have been well observed already; therefore, we shall here only recall the facts known by almost every photographer.

The addition of starch to the bath in the weak proportion involved in photographic manipulations, produces no effect either on the bath or on the proof; but it is not the same with two other substances employed in sizing, *viz.*, albumen and gelatine.

The gelatine size used in the manufacture of the paper, by dissolving even in a minimum quantity in the bath, communicates to it the property of becoming turbid and brown in the course of a few hours. If we ourselves add an additional sizing of gelatine in the preparation of the paper, this action is much more energetic. The silver bath dissolves a considerable proportion, and soon colours on contact with atmospheric air. On a large surface like that of a dish, the same reaction results—an insoluble and coloured combination is formed, swimming at first on the surface; and the paper prepared on such a bath is covered with marble-like stains, at the same time that they are rapidly tinted over their whole surface. Albumen, which is daily used in photography as an additional sizing, also possesses the property of altering and discolouring the bath, especially if the bath is rather weak or the temperature low. In these cases it is necessary to decolorise the bath; and two processes have been proposed to effect this, which are based on the employment of animal charcoal or kaolin. We will add a third, the efficacy of which we have discovered, and which is based on the precipitation of the chloride of silver.

1. *Animal Charcoal.*—This process, which is the first that suggested itself, is nevertheless the worst. Animal charcoal, in fact, whether pure or washed, possesses the property of rapidly diminishing the strength of the bath. Thus 2 grammes of washed charcoal (of commerce) have taken from a bath 1·2 gramme nitrate of silver. This enormous loss, which equals more than half the weight of charcoal employed, is undoubtedly due to the chlorides, or to the hydrochloric acid retained by the charcoal after the washing with this acid.

If unwashed charcoal be taken, the loss is less considerable; it is only one fourth of the weight of the charcoal used, and must be considered as due to the free lime which the charcoal contains after its calcination, which precipitates oxide of silver on the charcoal.

In every case, then, charcoal ought to be rejected. As a subsidiary question, we have examined if the bath decolorised by the charcoal had, as several writers have pretended, a dissolving influence on the albumen. We have not found it in the least so in the case of positive papers. Nevertheless, it appears that this is sensibly so in the case of negative proofs. It may be explained thus—that the weaker a bath in nitrate of silver, in other words, the more aqueous, the more, in consequence, is it susceptible of dissolving albumen; now, after decoloration by charcoal, the bath has, as we have seen, become greatly weakened, hence the more apt is it to attack the thin film of albumenised proofs on glass.

2. *Kaolin.*—Kaolin is very preferable to animal charcoal, as the strength of the bath is in no way altered by its use. The best method of decoloring the bath by this agent is, to employ it in small successive doses in a finely pulverised condition, and not to put in a large quantity to remain in the flask, because, in that case, its decoloring properties are speedily annihilated.

3. *Chloride of Silver.*—A third process which may likewise be employed when one has no kaolin, and which is, at all events, preferable to using animal charcoal, consists in employing for this purpose chloride of silver. It suffices, in fact, to add to the coloured bath a small quantity of a solution of chloride of sodium (about 8 or 10 drops of a solution at 5 per cent.), and to agitate violently, without waiting till the precipitate of chloride of silver shall have become curdy, and to repeat this operation a second and even a third time, to deprive it of its colour. The precipitate of chloride of silver which is then formed draws down with it the colouring matter, and restores it to a suitable condition. This mode of decoloring is, it is evident, very convenient, since it is always at hand, and is of little cost, for the effect is only to weaken the bath in an almost imperceptible proportion: besides, there is no necessity for throwing anything away; the separated chloride of silver which remains in the filter should be put with the residues. Kaolin is the best substance for the purpose; but in default of that, decoloration by chloride of silver constitutes a method which is both more economical, and preferable to the employment of animal charcoal.

(*To be continued.*)

* Continued from p. 256.

DR. MUSPRATT ON PHOTOGRAPHY.*

If a proof of the great importance of photography were required, we need not go further than the article in this clever work. From this it appears that, not only is an article on photography necessary to render any account of chemistry complete, but to such a length has the subject drawn the writer, that already a great part of No. 48 is occupied, and the article as yet by no means complete. As far, however, as the account goes we will follow, with the hope of gathering at least something from it, and making sundry observations on certain portions.

The first thought that rises in the mind of the reader, if he knows the art, is, that this goes further than any attempt to teach the *theory alone*; it is not as if the article were only inserted to redeem the work from an omission. The details, practical as well as theoretical, are given with every minuteness; different manipulators' formulæ compared; even the effects of certain lenses explained, down to the new combination of Petzval.

He commences by giving the composition of white light, with an engraving showing the seven coloured rays; noticing also the *extreme red* and *lavender rays:* from this he leads us to *actinism*, *light*, and *heat*, showing this also by an engraving. Here we perceive that, at the very point of the greatest *light*, the *chemical power* or *actinism* is absolutely nothing; and where the *light* and *heat* are least sensible, we must look for our work to be done when photographing.

Then comes the HISTORICAL NOTICE. Scheele, he says, was the first to draw attention to the sun's rays having the power of effecting chemical changes upon certain salts, more especially those of silver, and to show the comparative power of the different rays to darken them. He was followed by others; but it was Ritter who first discovered that beams not possessing luminosity, but having great power in producing chemical changes, existed in sunlight. Then Wedgewood published his method of printing on substances washed with silver, but owing to his being unable to fix them, although assisted by Sir Humphry Davy, the useful application of the invention was hindered. Then Nièpce, many years after this, partially succeeded in fixing these silver pictures, and published his "*Heliography.*" A tablet of

* "Chemistry, by Dr. Sheridan Muspratt, F.R.S.E., M.R.I.A." Article, "Photography," No.

plated silver was coated with a mixture of asphaltum and oil of lavender, and dried at a gentle heat; it was then exposed in the camera, and after due time the impression rendered visible by disengaging the affected parts by pouring on the plate one part oil of lavender, and ten of petroleum or spirit of tar, and then carefully washing. Shortly after he tried alkaline sulphides and iodine to deepen the shadows; and though this afterwards was the foundation of Daguerre's method, in his hands it proved no better than the first attempts. Nièpce died in 1833, and his son Isidore joined Daguerre in these experiments, until in 1839 the latter brought out the beautiful process called after its inventor. The French government granted both these men pensions, and its practice became universal. But during these experiments the English mind was at work with somewhat of the same inquiry. Mr. Henry Fox Talbot worked from 1834 until 1839 at his attempts to fix the images made by his camera-obscura, until on the 31st January, 1839, a paper was read by him to the Royal Society: "*Some account of the Art of Photogenic Drawing; or the process by which natural objects may be made to delineate themselves without the aid of the artist's pencil.*" Soon a fuller account of his method appeared, and it would seem as though the world were ready for the discovery, as two men were at work at the same time, seeking the same end, and yet probably one man did not know that the other lived; and neither process has the slightest connection with the other—indeed they are what we may almost term *different in principle*—the pictures of Daguerre being taken directly upon the plate, and those of Talbot having to be reproduced as "positives" from the original or "negative."

Talbot first used chloride of sodium as a fixing agent, then iodide of potassium was used; but these, and others, gave way to Sir J. Herschel's hyposulphite of soda, which continues to be used to the present time, every other substance having given way to it, except in the positive collodion process, where cyanide of potassium is used in weak solutions. Dr. Muspratt says that pyrogallic acid has '*superseded*' the gallic; but in the *paper* and *some glass* processes, the gallic is still used exclusively.

In 1848, Nièpce de St. Victor made the discovery that we called the albumen process; using glass as a support for the iodised albumen, and the pictures had many qualities superior to paper. Then, says Dr. M., Archer introduced collodion, and since that time, excepting modifications, little has been done beyond rendering the art more universal. Xyloidin, a compound prepared from starch and nitric acid, and tinctured with iodine, was introduced a few years since; but, notwithstanding its repute for being a better base of a picture, its use is not near so extensive as that of collodion.

Then, we have the notices of the PHOTOGRAPHIC ENGRAVING, in which the different methods of making the picture engrave itself, are discussed. The latter, he says, which might be called photo-galvanography, is not recent, but almost as old as the first bituminous impressions of M. Nièpce. Dr. Dorme attempted to engrave daguerreotype plates by light, and partly succeeded. Grove, in 1842, engraved the same plates by voltaic agency; where the agent was chlorine liberated from hydrochloric acid, in which the picture was immersed, attached to the positive pole of the battery. Then, in 1844, Fizeau and Claudet obtained a patent for another method; and, in 1853, Talbot published the most satisfactory process up to that time, *i.e.* the gelatine and bichromate of potass. Shortly after, Pretsch of Vienna published a process very like Talbot's; and, lately, Poitevin, of Paris, has used the same materials, and applied them to the lithographic stone with very good results.

Such are Dr. M.'s observations (or rather a summary of them) on the application of photography to the engraver's work; the last invention, however, of Fox Talbot—which is not discussed by Dr. M. in this number, viz., the "Photoglyphic Engraving"—is based on a totally different principle, as the photograph itself lays the etching ground, and the plate is at once made ready for the printer, without needing any electrotype, or other reproducing means. This, all must allow, is the greatest advance made as yet.

The OPTICS of photography are next discussed, commencing with the forms of camera, thence passing on to the different lenses, bringing us down to the *Orthoscopic lens* of Professor Petzval. Here again is, we think, an omission, viz., the principle of the new aplanatic lens is never mentioned. The single lens is noticed as giving a "*flat field but great distortion*," but Dr. M. forgets that this distortion has been greatly reduced in the aplanatic lens; and an account like this is hardly to be called complete, without the mention of this last great improvement.

The next stage is one which every operator should know at least something of, viz.: THE CHEMISTRY OF PHOTOGRAPHY. This is a short explanation, clearly given, of the change that takes place in the photographic picture, but, as this will be enlarged upon in the different processes, we need not waste space upon it.

The PRACTICE OF PHOTOGRAPHY commences with a description of the Daguerreotype Process, where every stage is separately discussed, and in conclusion this process is declared to be the most perfect of all processes; being unrivalled for microscopic perfection of detail, modulation of shade, and beauty of half-tone; and it is stated to be permanent when properly performed, and sealed in an air-tight case. As to its beauty there can be no doubt. Of all photographic pictures, the most beautiful we have seen were Daguerreotypes of statuary: the whites so brilliantly perfect, the utter absence of anything like solarisation, and the roundness of the figures were certainly unequalled by any other photographic productions we ever saw: but if a Daguerreotype is not *very good* it is *very* inferior; and the manipulation, to attain such perfection, is so difficult that it is seldom met with. The Collodion Process is described at great length, commencing with the description of the kind of gun-cotton required, and the method of making it. The iodising of collodion is then discussed, the advantages and disadvantages of the different iodides enumerated; and then we have the manipulation of the Negative Process. If any portion of the article can be called *the best*, perhaps, this would be it—the account is short, yet full and lucid, going through every stage, from the choice of glass to the kind of varnish. About this last there have been so many inquiries in the journals, that it may be well to give his opinion:—"The best varnish," he says, "is made by dissolving shellac in alcohol, so that it is not too thick to flow over the plate; it must be applied with heat, and when dry this varnish is extremely hard to scratch." Here we have the solutions, the appearance during development and exposure, and the fixing and finishing the picture. The Positive Process is also full and complete; and the operator may here gain that theoretical acquaintance with it, which if a man knows not, he is little better than a mere photographing machine, working without the slightest use of his brain. There are some simple, yet very useful facts, given as to the necessity of an *inorganic* developer; and the reasons, together with sundry directions for obtaining the best protonitrate of iron, which gives, perhaps, the finest results; and Fry and Archer's method of converting the negatives into positives.

In the Dry Collodion Processes, Dr. Hill Norris's comes first, and is described as "extensively employed and giving universal satisfaction." Fothergill's is not described with the fulness we should expect, being referred to as the substitution of albumen for gelatine, all else remaining the same as Dr. Hill Norris's; but here Fothergill states that it succeeds "pretty well if to be kept a few days only." In the short notice of the collodio-albumen, the proportions recommended differ considerably from those in common use; and it is stated to be "more complicated and troublesome than any other, and the negatives are of a bad colour." This, we fear, will bring this very perfect process into bad repute; and though an inexperienced photographer may justly think it troublesome at first, when worked systematically the labour is

little more than other processes require, and the results are fully as beautiful as any other process will give.

The Theory of the Collodion Processes comes next; the sensitive film's composition, the formation of the double salts, the difference of the positive and negative pictures, the free nitrate on the plates, and the fixing, are each noticed and discussed: and here again any man, *truly a photographer*, may gain no little from the study of this short portion of the article, and certainly must feel far greater interest in a subject with which he is theoretically, as well as practically, acquainted.

Finally (of the Glass Processes), the albumen process on glass is given with every detail; coating the plate is well described and rendered as simple as possible: but, we fear in giving the time required for development, viz., twenty minutes, he has made this process far more attractive than it really is, as one of its greatest drawbacks is the long time which it requires for this stage.

Here ends the account of the glass processes, and now what can we draw from this short notice of the article? Can any one either question the growth of this wonderful art, or assign a limit to it? The Cartoons from Hampton Court are its latest wonders; yet the great question of permanency still haunts photography; and how might this be most easily solved? Simply, by every man being grounded, as it were, in the theoretical as well as the practical part of the art before he begins to produce his positive portraits on glass, and sinks down into a satisfied state of mind when he can by *mere mechanism* produce worthless caricatures of his victimised friends. Many inventions are not brought out by the cleverest men; the mind naturally grows to the discovery of some great want, and is then led on from experiment to some unknown yet simple remedy: even by the merest accident many of our grand discoveries have been made.

Our advice is, to every beginner, make yourself acquainted with the theory; then the love of the art will grow and lead you on until you *must* become a photographer, and most probably a *great* one.

FADING OF PAPER PRINTS.

"Some time since a commission of inquiry was formed by the Photographic Society, for the purpose of getting at the cause of fading in the paper prints; and also to recommend the best way of rendering them permanent. Can you, Mr. Editor, give us, in a comprehensive form, the results from the above commission of inquiry, as any genuine information on this important question would be the greatest boon that could be bestowed on the photographic world? My friends, the professional photographers, are beginning to quake with fear and trembling for the great reckoning day when all their good works shall have faded away. It will be as well here to give a little experience of my own. I have been almost exclusively devoted to photographic pursuits since 1851, and have a few prints of that date that are as perfect as when made; but have had hundreds that have faded away, although great care has been taken in their production. This is clearly a proof that the fault is not in the system, but in some of the minor details that have escaped our notice. It seems to me that the main cause of fading is the decomposition of the hyposulphite of soda while in the print; probably, the free nitrate of silver decomposes the hyposulphite of soda, setting sulphur free on and in the pores of the paper: free sulphur being quite insoluble in water, it is not possible to wash it out; consequently it remains in the paper, and gradually forms sulphide of silver with the print on the surface. The slight tinge of delicate yellow, which nearly all prints show, in the light parts especially, if kept in the hypo. gold bath long enough to acquire a fine dark colour, clearly indicates the presence of sulphur in the paper; another proof is this:—take a print, hold it to the fire, then to your nose; *if it is a sharp one*, the unmistakable smell of sulphur is the result, although it may not show on the surface. If some of our theoretical chemists would be kind enough to explain this, the cause, and how to obviate it, it ought to be thankfully received by all the devotees to our beautiful but fleeting art."

H. Francis.

PHOTO-LITHOGRAPHY.

ANOTHER CANDIDATE FOR THE DISCOVERY.

M. Jobard has written a letter from Brussels requesting that a sealed packet deposited by him with the *Académie des Sciences* on the 2nd November, 1840, might be opened. This packet bore the superscription—"Description of Processes of Lithographic Printing of Heliographic Pictures," and the following were its contents:—

"Ever since my first essays in daguerreotype, which I was the first to import into Belgium, I saw the possibility of lithographing heliographic pictures, by receiving the impression of the solar rays on a stone or on a zinc plate covered with iodine. Being myself a lithographer, it was not surprising that I should be one of the first to think of it. The stone or zinc plate, instead of being submitted to the mercury, should be immediately covered with a thick solution of gum arabic, blackened with lampblack, and protected from the light until the coating of gum is dry; then you should plunge it into water to dissolve and wash it. It is afterwards placed in the press, and the roller passed over it; and the result is, the parts of the iodine decomposed by the light have been removed by the gum which has introduced itself beneath, and has *prepared the stone*,—that is to say, has communicated to it the power of repelling the greasy ink, while the undecomposed parts of the iodine take grease perfectly, whether the iodine remains, or whether it vanishes under the sponge used to damp it; pure whites are thus obtained, and proofs perfect in all their parts: but this operation is a delicate one, and can only be accomplished by a very able photographer. The zinc plate is treated in precisely the same way as the stone.

"The great feat consists in scarcely charging the roller with ink. The design may even be charged with greasy ink, if it tends towards impasting, and prepare it with acid, or rather with chloride of lime.

"I take the precaution of sending this process sealed, because I have communicated it under the seal of secrecy to Colonel Wittert, of Liège, who is at present making experiments, which I have not had time to make for a year past."

This note is referred to a committee composed of Messrs. Chevreul, Pouillet, and Regnault.

Critical Notices.

Stereograms of English Scenery and Interiors. By W. H. Warner. London, Ordish.

These views are chiefly of interior architectural subjects,—a department of photography which, we need hardly inform our readers, is one of the most difficult to obtain any great amount of success in. In Mr. Warner's series there is great inequality; sometimes he obtains results which would please the most fastidious, while at other times the pictures are by no means as satisfactory as we should desire: this, we apprehend, is not so much from any fault of manipulation, as from the photographer attempting a subject which would be almost certain to meet with failure. However, in some instances where he has tried his skill upon subjects that others have failed in, his pictures are, considering the difficulties he has had to surmount, decided successes. We think it right to make these remarks because the general public buy pictures, not so much for the photographic difficulties that have been overcome, but because they are pleasing and interesting. In many instances those before us are printed too dark, otherwise they would be entitled to rank as first-rate slides.

"Bishop Grandison's Shrine," and the "Altar Piece, St. Saviour's Chapel, Exeter," are two of the least successful, owing

to the want of half-tone, and the great intensity of black and white. In those views of portions of Exeter Cathedral, where there are large windows at the end of the picture, the strong glaring light has spoiled the whole effect. These faults, however, are by no means prevalent in the series, we only notice them here and there. Some views, such as the "Nave, Exeter Cathedral," "The North Aisle," "The Nave and Choir from the West Door," and many others, might be named as among the best and most successful interior stereograms we have ever seen. His sea-side studies are very interesting, and give the spectator a good idea of sea-side life. "Lobster Pots," "Ladram Bay, Devon," "The Pier, Torquay," are all interesting pictures and good photographs. The slide called "Smugglers on the Look-Out," is a very clever view of just such a spot as one might imagine would be a smugglers' haunt. The panoramic view of "Torquay from the Waldon Hill," is well calculated to give an impression as to what sort of a town Torquay is.

We are very much pleased with the information which Mr. Warner has given on the back of each slide, recording the time of exposure, the season, hour of day, and the description of lens. This is a class of information that would be of great use if it were more generally adopted by photographers.

Lessons on Colouring Photographs.

THE RELATIONS AND HARMONY OF COLOURS.

In speaking of the complementary relations of certain colours to others, it is not to be supposed that we are merely indicating the arbitrary classification of painters, or of theorists; we are explaining an absolute natural law, with which many of our readers may doubtless be familiar, and of which others may easily convince themselves by a simple experiment. If the eye be fixed steadily for a few moments on any object coloured with a pure primary colour, and then closed, an image of the object will remain upon the retina, but it will be of the complementary colour formed by a mixture of the two remaining primaries. To simplify the illustration, the familiar experiment with wafers of various colours may be tried. Take three wafers, one of each of the three primary colours; place one of them, say the red, on a piece of white paper, and look at it steadily for a short time, when it will appear to be surrounded by a narrow circle of green; or, on removing the eyes to another part of the paper, an image of the wafer, called an ocular spectrum, will appear before the eyes, but of a pale green tint, formed of a combination of the blue and yellow rays, and complementary, of course, to the red of the wafer itself. So with the remaining wafers; the blue being succeeded by an orange spectrum, and the yellow by purple; in each case the balance of colour being completed.

It is important to obtain and bear in mind a correct idea of these relations, because, on the skilful use of contrasts, much of the power of the colorist depends. Each individual colour possesses comparatively small value in itself; it is in its relation to and connection with surrounding colours that its beauty or value chiefly consists. A familiar and somewhat trite, but, at the same time, very striking illustration of this fact, is found in the comparison of painting with music. No single note possesses any musical value in itself; it is only in its relation to other notes that it possesses value; and as all the varied charms of melody arise from the succession of a few notes in happy relation, and all the sublimest harmonies depend on simultaneous combination of the same simple notes, so all that delights the eye in painting, except beauty of form, must arise out of the skilful combination, arrangement, and contrast of the three elementary colours. Again, it is important to understand fully these relations, for the simple and easy production of good effects; thus, if we would give brilliancy and power to a certain colour in the picture, it is not always necessary to intensify this colour itself to an undesirable or unnatural extent, for the same effect may be produced by bringing into juxtaposition, and degrading or lowering, its opposite; if any particular colour require warmth, the effect may be produced by cooling surrounding tints; and if transparency be required, it is obtained by contrasting with an opaque antagonist. And so in regard to many other effects, which can only be attempted, successfully, by a correct knowledge and intelligent application of these principles.

Harmonious contrasts are obtained by the juxtaposition of colours complementary to each other, and such colours are always mutually enriched by the contrast; whilst, on the other hand, colours not complementary are mutually injured by contact. Thus, yellow, and the secondary which is complementary to it, purple, both gain in richness and intensity by proximity; whilst, if purple and another of the primaries not complementary, say blue, were thus brought into contact, both colours would suffer. The same principle will, of course, apply to all neutral and semi-neutral tints, which, to give value to any more positive colour with which they may be brought into contact, should incline to the complementary of such colour; whilst, on the other hand, the intensity of any positive hue may be somewhat neutralised by an opposite course.

Contrasts, then, it will be noted, are always the most effective, as well as harmonious, when they are complementary. Even the contrast of light and shadow should be governed by this principle, for shadow will generally be not only the most effective, but the most natural, when of a hue complementary to the lights, as the familiar instance of the purple tone of the shadows during sunset, when the light is of a golden yellow, will illustrate.

It must not be imagined, however, that contrasts, however effective, and when quite complementary, are all that is necessary to harmony. Even in the monochrome of the photograph, as every photographer is aware, deep shadow and brilliant light become offensive, without the varied gradation of half tone to connect them. This necessity for gradation and connection is even more important in relation to contrasting colours; thus, orange and blue, whilst complementary to each other, and harmonious as contrasts, if used in their crude or positive state as the only colours in a picture, would be extremely unsatisfactory; but the addition of a few broken tints composed of the two, or of their elements, in varied combination, would at once give softness and harmony to the whole.

(To be continued.)

Photographic Chemistry.

CHEMICAL MANIPULATIONS—*(continued)*.

Of the Treatment of Residues.—The different photographic processes that have been described in this journal are principally based on the use of the salts of silver; and more rarely gold solutions enter into the manipulations. Now, as only a very small quantity indeed goes to the formation of the picture,—probably not much more than one-twentieth of the silver contained in the solutions,—it is evident that, even when photographers only exercise the art on a small scale, it will be worth while to take care of the residues; a very easy thing to do, and one which well repays what little trouble it may give. There is very little difficulty in recovering the silver, as we shall show; and photographers residing in London may even save themselves that trouble, as a reference to our advertising columns will prove. There are two modes of treating residues, which we shall describe: one of which consists in transmuting the silver into a sulphide; and this is one of the best, inasmuch as it acts on the silver, whatever may be the nature of the solution containing it. The other process consists in converting the silver into a chloride, which cannot be done when it is contained in certain solutions,—as, for instance, in those containing cyanide of potassium, or hyposulphite of soda; which are the very solutions that are richest. There are cases, however, in which the latter process is preferable, from its simplicity. Suppose a silver bath is out of order, and the

reason why cannot easily be found and remedied, it is in such a case far better to extract the silver from it, than to waste time in what may, after all, prove futile efforts to restore it to its original condition.

The process of reducing the silver in the residues to a sulphide is thus accomplished:—

Precipitation.—Sulphide of silver is, as we have already said, insoluble in all the solutions used in photography; all that is required, therefore, is to bring the silver contained in these solutions into the condition of sulphide of silver, to enable it to be collected with facility, and afterwards to reduce it to metallic silver. The apparatus used for this operation is thus arranged:—Two wooden tubs of equal capacity are selected, and a hole bored in the side of each about one-fourth from the bottom, into which a wooden tap, like those used in brewing operations, is inserted. These vessels should be placed one above the other, in such a position that the contents of the upper vessel may be run off into the lower one. We will suppose that this is done; we now take all the residues that have accumulated, without considering whether they contain cyanide of potassium, or hyposulphite of soda, or anything else; and pour them into the upper vessel. When this is sufficiently full, a solution of *liver of sulphur* (polysulphide of potassium) should be added, the whole being well stirred during the operation: the solution should be formed of one part of liver of sulphur, to three of filtered water. The effect of adding this solution is, that a sulphide of silver is immediately precipitated, and the addition of the solution and the stirring must be continued until this ceases. If the liquid contains free acids, it will assume a milky colour, owing to the deposit of sulphur, and a strong odour of hydrosulphuric acid will be emitted: hence it is advisable that the tub containing the residues should not be kept in the laboratory.

When it is considered that the operation has been completed, the liquid is left to settle, which it will do in less than an hour, when the tap is opened and the almost clear water is allowed to flow into the lower vessel, into which a small quantity of the sulphur solution may be stirred, and then left to itself for an hour or two. In this way any silver which may escape from the upper vessel is certain to be secured in the lower one. The water is then run off, and the black precipitate at the bottom of each vessel collected, and dried on a piece of linen extended across a wooden frame, or on blotting paper, or in any other way that may be more convenient. The dry powder may then be put away until a sufficient quantity has accumulated to make it worth while to proceed to the next operation, viz., extracting the metallic silver.

Reduction.—The precipitate referred to above is formed in great part of sulphide of silver, mixed with an excess of sulphur and some water. This is placed in a crucible, without the addition of any other substance, and heated gradually to a dull red heat in a furnace. At this temperature the sulphur becomes volatilised, and will be seen to burn on the surface. When the sulphur ceases to be driven off, which will be when the flame goes out, it will be found that the substance has diminished considerably in volume, there will therefore be room to add some more of the powder, and the operation may in this way be continued, until the crucible appears about half full, when the sulphur has all been consumed. When this has been accomplished, carbonate of potash is added in the proportion of about one-third of the quantity of sulphur used, and a little borax to assist the fusion; some bits of iron (nails broken up will do) are forced down to the bottom of the crucible, care being taken that there shall be an excess of iron. The cover of the crucible is then placed in its proper position, and charcoal heaped up over it, the fire being urged for half or three-quarters of an hour, so as to keep the contents of the furnace at a bright red heat. In this time, the sulphide of silver is decomposed by the iron, a sulphide of iron is formed, and the silver is liberated and collects together in the bottom of the crucible. At the end of the time mentioned, the cover of the crucible may be removed, and the iron which has not been attacked taken out, and the remainder left to cool. When cold, the crucible may be broken, and an ingot of silver will be found.

(To be continued.)

Dictionary of Photography.

Background.—A frame covered with cloth, generally from six to twelve feet long, and six to eight feet high, supported by posts at the ends; movable upon the floor of the operating room, and placed behind the sitter for the purpose of giving the proper tone to the surface of the plate behind the picture. It is easily constructed of common deal boards and cotton cloth, which may be painted of any dark colour, to suit the taste of the operator; a dark Roman ochre, moleskin colour, or a blueish grey, have been found to be the best adapted to the purpose. Some operators prefer to have it painted in landscape or panelling for the purpose of improving the effect. Dr. Dorat has suggested, and used, a background, which he terms the *chromatic background*, the effect of which, upon the pictures, is very good. He describes it thus:—It consists of two wooden frames, of any size required; one of them, on feet, as usual, is covered with a light yellow canvas cloth, strained on it or not; the screen stands perpendicular upon the floor; at the lower part is attached the other frame by means of a couple of hinges, it rises at an angle of 44°; two small slips of wood secure it in this position at the upper part of the first frame; this is covered with a well-strained piece of black or brown lace; it can be procured three yards wide, and may be dyed to the requisite tint.

Baryta.—An earth, composed of one equivalent of oxygen to one of barium. It is a grey powder, procured by exposing nitrate of baryta to a red heat. It is highly alkaline—converting vegetable blues to green, and neutralising the strongest acids; it is, however, less caustic than potassa or soda, and is insoluble in pure alcohol. Like lime, it slakes when in contact with water, forming a white hydrate, which fuses at a red heat. It is slightly soluble in water.

Base.—The electro-positive ingredient of a compound or salt. Any alkaline or earthy substance, combining with an acid, forms a compound or salt, of which it is the base. Thus—soda is the base of sulphate of soda; oxide of silver is the base of nitrate of silver. It is a term most frequently applied to metallic oxides; those of the alkaline metals are the most energetic.

Basic.—A term applied to a salt in which the base is in excess of the acid.

Bath.—A term applied indiscriminately to the solutions in which photographic papers and plates are immersed, and also to the vessels in which they are poured when in use.

Benzoin.—A solid fragrant balsam. The tree which produces it is the *Styrax Benzoin*, growing in Siam, Java, and Sumatra. It is obtained by incision, and exudes in the form of a white gum, which solidifies and becomes coloured in the air. The benzoin which is used as a varnish comes from Sumatra. The first quality is called *benzoin amygdaloide*, on account of its appearing in the form of almonds; the second quality is the common benzoin, in reddish masses, from which the former kind has been picked. Benzoin of Siam, or benzoin with a vanilla odour, is of too high a price to be used as a varnish—it is employed as a perfume.

Benzol.—The chemical product to which this name was first applied is a carbide of hydrogen, obtained by the decomposition of benzoic acid. The commercial substance known under this name is a colourless liquid; volatile, without residue; inflammable; and of a penetrating odour, but which soon disappears. It is obtained from the products of the distillation of coal, and is one of the principal ingredients of coal tar naphtha. It has been successfully applied to cleaning daguerreotype plates. It dissolves with great

facility fatty and resinous bodies, and is much used as a solvent for such bodies in the preparation of varnishes. When it is colourless, it possesses the great advantage of not resinifying like essence of turpentine.

Bibulous.—Spongy, porous; capable of readily absorbing water or moisture.

Bichloride of Mercury, or Corrosive Sublimate.—A poisonous salt, composed of one equivalent of mercury and two of chlorine. It is a white substance—crystallising in satiny needles—soluble in water and alcohol. It is volatile, without residue, by the action of heat, and this is one of the tests of its purity. Corrosive sublimate serves in photography to whiten glass positives, and to redden positive proofs which have been toned with chloride of gold.

Bichloride of Platinum.—A compound of one equivalent of platinum and two of chlorine; prepared by dissolving platinum in concentrated aqua regia, and evaporating to dryness. It forms a dark red-brown mass, and dissolves readily in water, forming a yellowish solution. It has recently been proposed to employ bichloride of platinum in toning positive prints instead of the expensive chloride of gold. Further experiments, however, are required on this point before it can be recommended as a substitute.

(To be continued.)

A Catechism of Photography.

EXCITING THE PLATE.

Q. How is the plate thus prepared rendered sensitive to the action of light?

A. By being plunged, at one stroke, into an aceto-nitrate bath, prepared in the following proportions:—

Nitrate of silver	1 ounce.
Distilled water	10 ounces.
Acetic acid	6 drachms.

A small quantity of animal charcoal is sometimes added.

Q. How long is the plate allowed to remain in the bath?

A. About one minute. After this it is removed, and a stream of water passed over it, so as to cleanse it from every particle of the bath solution. It must then be allowed to dry, and until thoroughly dry must on no account be placed in the camera.

DEVELOPMENT OF THE IMAGE.

Q. How is the picture developed?

A. By the application of the following solution:—

Water	1,000 parts.
Gallic acid	3 parts.
Pyrogallic acid	1 part.
Spirits of wine	20 parts.
Acetic acid	5 parts.

And at the time of application a very small quantity of nitrate of silver must be added.

Q. How is this solution to be applied?

A. By being poured over the plate until every part is covered.

Q. How long should the solution be allowed to remain on the plate?

A. Until the picture begins to appear.

Q. How soon will the development take place?

A. In about five minutes.

Q. What should be done when the picture begins to appear?

A. The solution should be poured off; it should then be poured on again, and this process of pouring on and off continued until the lights and shadows of the picture are fully brought out.

Q. What should be done when the picture is fully developed?

A. The solution should then be finally poured off, and the plate thoroughly washed in pure water.

Q. How long will the whole process of developing occupy?

A. From ten to twelve minutes.

FIXING THE IMAGE.

Q. When the picture is properly developed, how is it to be fixed?

A. By the application of the following solution:—

Hyposulphite of soda	2 parts.
Distilled water	16 parts.

This solution should be poured over the plate, and in a few seconds the yellow film on the surface will disappear.

Q. When the yellow film has completely disappeared, what is to be done with the plate?

A. The fixing solution must be drained off, and the surface of the plate thoroughly washed; it must then be allowed to drain and dry in an upright position.

VARNISHING THE PLATE.

Q. When the plate is dry, is it ready to receive the coat of varnish?

A. It is; and the same varnish as used in the ordinary collodion process must be employed, being applied in exactly the same manner.

MANNER OF PRESERVING THE PREPARED GLASS.

Q. In what manner are the glass plates prepared in the manner already stated to be preserved?

A. By excluding them from the light in a grooved box with an over-lapping lid.

Q. How long will plates so prepared retain their chemical activity?

A. For a fortnight or three weeks.

Q. Must they be developed immediately on being taken from the camera?

A. No; they will retain the image unimpaired for days, and may consequently be brought home to be developed.

Q. Have not some important alterations been introduced into M. Taupenot's process?

A. Yes: M. Gaumé has introduced a non-iodised collodion, which he spreads upon the glass in the ordinary manner, washes immediately in water, and confines the application of the aceto-nitrate of silver to a single immersion. M. Bayard employs a bath of gelatine.

Q. How is the gelatine bath compounded?

A. In the following proportions:—

Filtered water	1,000 parts.
Pure gelatine	25 parts.

As soon as the gelatine is dissolved, add—

Iodide of potassium	200 grains.
Bromide of potassium	48 grains.

Filter through a piece of fine linen.

Q. What description of collodion is applied?

A. A non-iodised collodion, the solution consisting of ether, gun cotton, and spirits of wine.

Q. How is the image developed?

A. By the application of the solution used in the ordinary process.

(To be continued.)

Correspondence.

PRINTING IN CARBON.

Sir,—More than once have you adverted to the sensation created in the photographic world by the carbon process of Mr. Pouncey. I believe, in every journal devoted to the science, and in many not so, has the mode of manipulation been published, and yet, strange to say, scarcely a correspondent has alluded to the subject. This I can only account for in two ways:—The notices and specimens of this process have not been alluring enough to tempt experimentalists; or, the extreme nullity of the result has caused a reserve in publicity.

Induced by the reputed permanence of the prints, I attempted, some time since, to obtain a few pictures by this method; and, I will own, I was sanguine enough to entertain

ideas of "out-pounceying Pouncey," and producing representations of nature "for perfect delineation, depth of tone, and middle tint, surpassing," &c. &c.

Some pardonable anticipations were indulged, as with polished marble slabs and a few drachms of the "liquid dust," the preparatory grinding commenced.

The effect of the first half hour's labour, I was prone to consider, was as palpable in the arm-joints as elsewhere, and this may possibly, at the expiration of an hour, have facilitated my comprehension of the fact, that there *is* a "limit to mechanical diversion." At any rate, I commenced the admixture of the gum, bichromate, and carbon; being careful to adhere scrupulously to the authorised description, that is, where the boundaries are discoverable. Preparing the paper, coating and allowing for absorption, the "hog's-hair softener" was next called into requisition, and after a deal of "horizontal and vertical" brushing, some half-dozen papers were prepared with a tolerably smooth surface. These when dry were exposed,—the first, the maximum advised; the second, the minimum; the third, one half the latter; the fourth, some 30 or 40 seconds, and the remainder hap-hazard. They were then consigned to the troughs. At the end of twelve hours they were examined, and my expectations fell suddenly to zero, as I discovered that the least exposed of the batch showed no symptoms of precipitated carbon.

Well, Sir, to be brief, I have since tried solutions of gum of nearly every degree of fluidity from that of oil to water,—have used the bichromate in many proportions, brushed and omitted brushing the paper, and read the rules backward (in hopes of information), but still *the carbon won't fall.*

That there exists some latent cause for these failures, I cannot doubt, nor do I censure the process for my individual results; but I would remark that a method requiring such extreme vigilance and care to produce any picture at all, must not be expected to supersede (as some aver) the argentine practice, in which the amateur's first print is often as fine as the negative will produce.

I have been more successful with the modification of the Ink process, communicated in a late number of the "Photographic News." The principal drawback is the slaty hue of the lights; and this difficulty I find insuperable, as, although reduced by a more sparing use of gelatine, it is at the expense of the sharpness.

Allow me, in conclusion, to thank "One of Devon" for the admirable intensifier given in his communication at p. 130. It is the best I have ever met with. I think, however, some of your readers will find the solution of iodine there recommended of insufficient strength if the picture be old. In one instance, where the positive had been varnished with arabic (this subsequently re-dissolved), the undiluted tincture alone proved effective. Euphos.

Sheepscombe.

THE PHOTOGRAPHIC SOCIETY.

Sir,—In justice to the gentleman, whoever he may be, who wrote the report published in your journal of what took place at our last meeting, I cannot refrain from offering you my testimony as to the fair, full, and impartial manner in which he performed the task. I say, in justice to that gentleman, because all of us who are furnished with an official report of what passes, and who are unable to be present at the meetings, as comparatively few of us are, may, on reading that report, imagine that he has stated many things which never took place, simply because they are not contained in the official report.

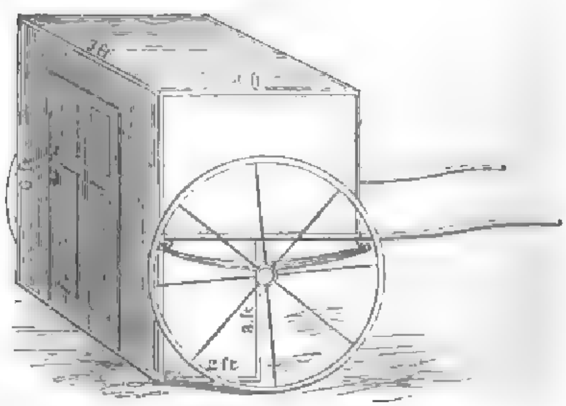
I do not hesitate to characterise the official report as a garbled and inaccurate one. The complaint of Mr. Malone as to the slovenly and inaccurate manner in which the reports are published, as well as that of Mr. Hughes, are carefully suppressed, as are also sundry complaints of the manner in which the affairs of the Society are managed.

If my memory serves me—and you will correct me if I am wrong—it was stated by the council, a few months back, that in future the official organ would have no recognised editor, and, judging by the report before me, it really has none. It reads as if a compositor had been intrusted with condensing it, and that the editing had been done by the printer's devil. To cite one particularly glaring blunder. The President in his address referred to M. Niepce de St. Victor as "the celebrated foreigner who had made the remarkable discovery of a method of storing-up light." The printer's devil, or somebody else, fearing that we might not know the name of the celebrated foreigner referred to, took upon himself to try to enlighten us upon this point, and appended a foot-note stating—what? why, that this celebrated foreigner was named *Victor St. Niepce!* Such an utterly absurd jumble of a man's name I never before met with; and the ignorance displayed by the writer will be the more offensive to our foreign brethren in the art, from the fact that the distinguished individual meant is an honorary member of the Society.

In conclusion, I may observe that if we are to be snubbed when we offer remarks at our meetings on the management of our own Society, and our just complaints to be concealed from our absent fellow-members, the Society is worse than useless for carrying out the objects for which it was originated, inasmuch as it is in the position of the dog in the manger, it will not carry out those objects itself, and at the same time stands in the way of the formation of another society which *would* accomplish them. The real fact is, that only a comparatively small number of members are present at any meeting, while the council is represented in an overwhelming proportion; and, as in all such bodies there is certain to be a number of men who are influenced by the "snobbish" feeling which leads them to do as any man of mark among them does without question, no independent member has the slightest chance of carrying any amendment in opposition to the wishes of the council. As an example, the council have expressed an intention of entering into a law-suit, which may end no one knows when or how, very likely in our being defeated; yet the opinion expressed by one of the members that, before entering into such an important matter, the council ought to have consulted the whole body of the members, was pooh-poohed.—I am, sir, your obedient servant, A Member of the Society.

THE PHOTOGRAPHIC BARROW.

Sir,—In these days of steam and progress, everything that does not partake of the "spirit of the age," or a locomotive tendency, is sure to be distanced by a *faster* rival; and, with this conviction, some months ago I contrived a photographic barrow, a drawing of which is annexed.



Simplicity of construction, cheapness, and extreme comfort, are its great recommendations; and its mode of *propulsion*, or *traction*, is perfectly at the option of the photographer. If of a self-reliant and independent spirit, he would doubtless prefer "pushing his case" before him through the world;

or, if more inclined to indulge in the *dolce far niente*, he can attach to the shafts a pony of Jerusalem, and slowly drive along through many a pleasant way of "merrie England." The barrow in question is an exceedingly light and simple affair, consisting of a slight but strong framework of wood, covered with American cloth, and balanced upon springs attached to an axle, on the arms of which two nicely made, but extremely light, wheels rotate; the addition of shafts completes the concern. We have then a perfectly *light-tight* chamber, of the following dimensions, to manipulate in:—

Height	6 feet.
Width	3 "
Breadth at top	4 "
Breadth at bottom	2 "

The aforesaid chamber is entered by a door, situated behind, and lighted by an orange-coloured glass pane in front, immediately above the operating bench (3 feet wide and 2 broad). Ventilation is duly provided for by means of blinded apertures at top and bottom—thus securing that coolness and serenity so necessary to successful manipulation. When about to operate, two struts are lowered from the shafts, and two from the posterior angles of the chamber, which immediately render the vehicle perfectly stable, and the manipulator may safely tread the floor of his chamber without fear of what seamen designate as a "capsize." Ample space is provided for apparatus, &c., and for that photographic essential—abundance of water. Trusting that the accompanying sketch may render the construction and utility of the barrow patent to all,—I am, sir, yours obediently, Thomas W. Howard.

Photographic Societies.

Manchester Photographic Society.

A meeting of the above Society was held at the Literary and Philosophical Society's Rooms, on Wednesday evening, the 2nd instant, Mr. Parry in the chair.

The Chairman called the attention of the meeting to the subject of the Stereoscopic Magazine which was intended to be published by the Society and distributed to the members, and invited members to send to the Council as early as possible copies of stereoscopic pictures, from which a selection would be made for the Journal.

The Secretary, Mr. E. Mann, stated that Mr. J. L. Davies had presented four photographs to the Society's portfolio; these were handed round, and much admired for their tone and sharpness. Upon the suggestion of the Chairman a vote of thanks was passed to Mr. Davies for his present. Mr. A. Brothers presented a print taken by him two years ago. Its interest consisted in the colour being retained, although it had not undergone the usual process of washing, having been only once rapidly passed through water at the time it was taken, while others printed at the same time and well washed had faded.

Mr. Sidebotham read a letter received by him from Mr. Shadbolt, respecting the subject of developing by daylight, which Mr. Shadbolt stated he considered to be of great importance, and expressing a wish that the members of the Society would communicate to him further information as to the results of their experiments.

Mr. Dorrington explained the satisfactory results of his experiments on the raspberry syrup process. The only difficulty he had to contend with was, the extreme tenderness of the film, but he was glad to say that he had now discovered a method by which this could be entirely overcome; he said that he and Mr. Neville had made numerous experiments relative to coating the glass with dilute albumen and other substances, previous to the application of the collodion, and he had at last discovered a plan which was everything that could be desired, rendering the film so firm upon the glass that it would bear any amount of washing without injury: even a waterspout would not remove it. He also thought it would entirely prevent the possibility of blisters in the collodio-albumen process.

This plan was, to coat the plate with a solution of gelatine in alcohol, and when dry apply the collodion in the usual way; the solution of gelatine in alcohol he used was the same as that recommended by Dr. Hill Norris, the formula of which is given in the number of the "Journal of the Photographic Society," of the 22nd December, 1856, page 179, and used by Dr. Hill Norris for coating his dry collodion plates; but Mr. Dorrington thought it more advantageous to use about one half the quantity of gelatine.

Mr. Sidebotham said he thought Mr. Dorrington's discovery very important; he had tried it with a collodio-albumen plate, and had found it impossible to get blisters. He had also rubbed the glass with his finger previously to the application of the gelatine, and had not been able to observe any trace of the same on developing; he, therefore, thought this plan would obviate the necessity of cleaning the glasses so carefully. A general discussion took place upon the subject; the members arguing that Mr. Dorrington's plan would be exceedingly valuable for all processes. A number of stereoscopic prints on glass, taken by Mr. Dorrington with the raspberry syrup process, the plates being previously treated with the gelatine solution, were exhibited to the members, and were considered very beautiful, being particularly bright and clear. A vote of thanks was passed to Mr. Dorrington for his valuable communication.

Miscellaneous.

Autography of the Stratifications of Electric Light, by M. Charles Morren (being a letter addressed by him to the President of the Paris Institute).—"Allow me to inform you of certain facts which I met with while carrying on the researches, which have occupied my attention for some time past, on the electric light, on the stratification it presents not only in rarefied gases, but in gases submitted to increasing pressures from the $\frac{1}{300}$th of an inch of mercury up to several atmospheric pressures. I sought for the means of compelling the electricity to trace, and so to speak, to autograph for itself, the stratifications, upon which the nature of the ponderable matter necessary to the passage of the electricity has a great influence. Having had consequently occasion to vary both the nature of the gas submitted to the spark, and especially the nature of the electrode, I have obtained several combinations worthy of remark: thus, in a tube where the spark of the induction apparatus was produced between wires of platinum, I caused to pass a suitable mixture of hydrogen and nitrogen, by means of two mercury gasometers. Ammonia was directly produced, and absorbed as it was formed by a standard solution of sulphuric acid and water. The gaseous mixture thus always remained in conditions favourable to combination. Two bands of litmus paper reddened by an acid were restored to a blue in less than a minute. In my first experiment I thus formed thirteen cubic centimètres of ammonia. By taking charcoal electrodes and causing the hydrogen to circulate, I obtained a carburetted hydrogen, of which I have not as yet fully ascertained the nature. I am engaged at this moment on the subject of cyanogen, of which I have already verified the formation. The electric current thus presents the one particle to the other in a nascent state, or in the *ozonised state* favourable to their combination. The apparatus I now possess enables me to continue these experiments with ease." A second letter was addressed by the same gentleman to the Abbé Moigno, the able editor of *Cosmos*, which was as follows:—"I take the liberty of forwarding you a copy of a letter that I sent to the President of the *Académie des Sciences*, through M. Dumas, to inform him of some results which seemed to me deserving of interest. You will see in it the indication of the experiments, which, for a long time past, have engaged my attention, and of which you have already been kind enough to make mention in your journal, on the occasion of a communication made by M. l'Abbé Gras, of Marseilles. The question of the stratification of electricity has attracted the attention of many eminent physicists; and you have published Mr. Grove's views with respect to this matter. I do not share the opinion which attributes this phenomenon to the intermitting induction. Now, when we differ in opinion with a person who is such an authority as Mr. Grove, it is necessary, in our experiments, to look closely into them with greater attention, and to repeat them more than once. I attribute the stratification to a variation in the intensity of the tension of the circulating

electricity, but especially to the insufficiency of the gaseous conducting body, through which the current passes. I believe that the stratification is a general phenomenon; the smallest spark is stratified, whatever may be the pressure of the gas, or of the medium in which it is produced. The nature and density of the medium traversed have an enormous influence in rendering the stratification more or less visible. Thus, in hydrogen, it is always very beautiful and very apparent, and this circumstance furnishes another proof of the metallicity of this gas. It conducts relatively the electricity very much, by comparison with the other gases. The carbon, in gases, and in the vapours in which it enters, communicates this same property, by reason in fact of its conducting power. The essences, alcohol, and bisulphide of carbon, give the proof of this. Besides, to make my opinion more clear to you, permit me to point out to you an experiment with which you are familiar. If a powerful discharge of static electricity be made to pass through a sufficiently fine thread of metal (platinum, silver, or gold, &c.), this opposing a too considerable resistance, lateral discharges are directly produced, which reduces the metal to a vapour and a very fine powder, and driving it, by reason of the polarised air, towards the neighbouring bodies. If a sheet of paper, or better, a cylinder of paper, is suitably placed above or around the thread, the lateral discharge may thus imprint on the paper the stratifications of the electricity. If even the thread be too thick to be broken and reduced to powder, the passage of the discharge suffices to detach and throw to a distance, either the light powders, or the layer of oxide which may coat the metal, if it is oxidisable. A copper chain placed on a sheet of paper or a porcelain tablet, thus admirably designs its imprint, even with a feeble discharge. The specimens enclosed herewith, made with a very slight spark, will furnish you with the proof of this. If the pressure of the gas in which the spark passes is augmented (I have carried it to three or four atmospheres), the stratifications approach so closely as to touch. They separate, on the contrary, if the pressure is diminished. Finally, when the gas is sufficiently rarefied to conduct the electricity, the electric fluid passes well along the thread, but neither volatilises it nor melts it, because the electricity finds a passage in each file of the gaseous particles, which then appear gifted with a considerable facility of polarisation. There is at the same time a passage from one conductor to another, with multiplied sparks, through the polarised gaseous medium, then induction and lateral discharges towards the neighbouring conducting bodies, and it is in that which consists the phenomenon of the stratification. When the pressure of the gas is great, the spark is so extremely vivid that the dazzled eye cannot perceive the stratification, the imprinted design alone reveals it. An appropriate diaphragm would enable it to be seized in its passage. The nature of the gas has more influence on the stratification than the metal has, and the aspect and details of the stratification are singularly modified by the form of the vessel which contains the gas. The mode of egress of the electrodes is, for light, entirely different, and its study leads to the explanation of the metallic volatilisation which, in Geissler's and M. Plucker's tubes, takes place at only one of the poles. But I have already extended my letter to a much greater length than I ought to have done. Pray excuse me, and receive the expression of my respect."

Photographic Notes and Queries.

HOW TO TREAT SILVER RESIDUES.

SIR,—Your kindness in replying to a former inquiry induces me to trouble you again.

I have a quantity of old hypo. toning bath in which I have fixed some scores of prints, and it has in consequence become, by use, quite a red-brown colour. It throws down a considerable deposit, of dark colour, after standing in the dishes for a few days, or after fixing any prints in it. I have been in the habit of filtering it, and adding gold and hypo. to it, and have always been able to get it to work again. I take the prints direct from the press (first cutting off the superfluous edges), and immerse at once in the fixing bath, and from first to last I should think there must have been added at least twenty shillings worth of gold. I see some say—throw away old toning baths; but I throw away nothing, and will (if not trespassing on your space) give you, at the end of this letter, a simple and effective way of recovering silver from old paper cuttings, to the value of which I can testify, as I have three nuggets of silver, each exceeding one ounce, produced from them. My object is now to inquire of you if you can give me a good method by which I can recover the gold and silver, of which I am sure there must be a quantity, from this old toning bath of mine (about six pints); as I have lately found it does not revive so effectually as formerly, and would rather make up a fresh one to begin printing with in the spring.

Also, what is the nature of the black, or, rather, brown-black deposit?* Is it blackened chloride of silver, accumulated by fixing the proofs without first washing off the free nitrate? Is it sulphate or sulphite of silver, produced by the decomposition of a portion of the hypo.? Is it an oxide of silver, or is it gold, or do each or part of these enter into its composition?

These are, I admit, very lengthy inquiries; and as I am already in your debt, I beg to tender my very sincere thanks for last week's favour, to "Not up to the Mark," and remain, yours obediently, ONE WHO TRIES.

P.S.—If worth the space of an insertion, the following is a thoroughly practical and easy method to reduce all kinds of silver residues to the metallic state. I save the residues of everything in which silver has been used at all, as follows: the cuttings of paper off the edges of prints before toning (this also saves a good deal of gold); the cuttings after fixing or mounting; all the filter papers, kaolin, &c., used to decolor the printing bath. I keep a dish with a lot of salt in it, and into it pour the washing of all bottles, baths, &c., and which of course saves every atom of silver present. I also develop glass positives over a dish having a hole and pipe in it, which carries off the developing solution, and with it a quantity of reduced silver to the bottom of a cistern underneath, from the top of which the excess of water flows by a pipe into the sink, leaving the silver at the bottom.

About once a month I have a burning match on a dull day. I burn all the clippings, filters, &c., collect on a filter all the chloride of silver from the dish of salt (first washing to be rid of excess of salt), also all the deposit from the developing cistern, burn these filters also, and carefully preserve all the ashes. I now take a large mortar, and having placed in it carbonate of soda, add to it nitrate of potass and grind together, adding the ashes a little at a time, till all are thoroughly incorporated. I then place it in a Stourbridge clay pot, and take it to a blacksmith's forge (it is never half performed in a common fire, blow how you will); well surround the pot with cinders (not wet coals), and blow up steadily. I find it melts more readily than brass; however, when you see the flux in a boil, and by stirring it with a piece of wood cannot get up any lumps not in a state of fusion, take a pair of tongs and warm them slightly, or ten to one the pot will fly; lift the pot from the fire, shake it well, and, with a piece of wood, remove as much of the flux as possible, return the pot to the fire and get it once more hot, and if, on turning aside, the silver will not present itself without some of the flux, take off as much more as possible, and, by shaking, the silver will run in a little button on a dish of sand quite free.

The best way to make nitrate of it is to have another pot kept on purpose, and remelt the silver and pour it into a bucket of cold water, which will granulate it, and separate particles of sand which adhered before. This method prevents the necessity of breaking a new pot every time; also, by using the same pot again, if any silver remains in the last portion of the flux, it is obtained the next time there is any to melt.

[The subject of treating and reducing silver residues has been so fully gone into in our Chemistry, that further expla-

* It is apparently of quite a different nature to the scaly deposit sometimes formed on the glass bottle after standing some time, and which may be rubbed off in flakes, but which immediately fall to the bottom.

nation is hardly needed. If our correspondent precipitates his old hypo. bath with liver of sulphur, and then obtains the silver from the sulphide in the form of a fused lump, the gold will be all contained in it, and will be left undissolved on treating the metal with nitric acid. The black substance deposited by the old fixing bath is sulphide of silver, Ag S, with, perhaps, a trace of sulphide of gold, Au S_3. Ed.]

ALBUMEN PROCESS ON COLLODION.

Sir,—I have been re-perusing your excellent paper on "The Albumen Process on Collodion," which you published in June, 1857, where you adopt the modification of Taupenot's process introduced by M. Gaumé. With this exception, I do not perceive much difference between your process and that of Mr. Sidebotham, in p. 170 of the "Photographic News;" but the exception is so important that I should be glad to know from Mr. Sidebotham or yourself whether experience is in favour of the employment of iodised or uniodised collodion?

There is another point in the collodio-albumen process, which appears to me important. Dr. Riley, of Islington, who has practised this process with great success, has recently drawn attention to the importance of washing off the coating of albumen, in the same way as in Fothergill's process. This, he contends, not only renders the plates so prepared more sensitive, but, as a necessary consequence, lessens the time of exposure and of development. I am informed that the only drawback to washing the albumen off the plates is that they will not keep so long. I have, however, seen some excellent negatives taken by this process, the plates having all been well washed after being coated with albumen, as recommended by Dr. Riley. An Amateur.

NOTES ON COLOURING PHOTOGRAPHS.

Sir,—Some twenty-five years ago I took lessons from one of the best miniature painters of the day. One thing I learnt, it may be worth your while to incorporate with your lessons on colouring photographs. I have tried the method upon some of the prints which I amuse myself sometimes by painting, and find it of great assistance; and glad shall I be to add a mite to the immense stock of information and amusement to be found in your "News."

Before I commence with colour, I size the print, and mount it on good thin Bristol board. After the painting of the photograph has been well advanced, I hold the print up to the light, with the back towards myself, and with a pencil outline the face, neck, and hands. I have a clean and highly burnished copper plate, and a small polished castor, fixed into a handle. I lay the photograph, face downwards, on the burnished side of the copper plate, and with the castor go over, with a very heavy pressure, the spaces included in the pencilled outlines. This gives a better surface than any other plan with which I am acquainted; and the painting may now be proceeded with, and the portrait worked up, as highly as any miniature on ivory.

Gateshead. D.

SUGGESTIONS FOR IMPROVING THE STEREOSCOPIC CAMERA.

Sir,—Will you allow me to suggest to camera manufacturers, through your valuable "News," that they should contrive a stereoscopic box camera, so that it could be used with *two* lenses to take both pictures at the same time, or with *one* lens in the ordinary way at pleasure. I presume this could be easily done by mounting a *twin* lens camera upon Latymer Clark's parallel bars, with some means of shutting off one camera entirely, when needed; the advantage being that, in taking a view of distant objects, a wide separation of the pictures could be made without trouble.

The contrivance I mean need not be expensive,—indeed an ordinary *twin lens* camera *upon bars* would do, as keeping the cap on one lens would shut off the light, and the picture could then be taken *through one lens only*, as in a single camera, provided the back were made to admit of the slide being moved. J. W. W.

GELATINE PAPER.

Sir,—I think there are only one or two places in London where the "gelatine paper" can be procured. I inclose you a specimen, which is very clear and transparent; the thicker kinds are not, I think, clear enough. I fancy the objection to using the gelatine paper, as a vehicle for the collodion film, would be, that it is not near so even a surface as glass. I have not myself tried it, as I prefer transferring the film; but, by placing a piece on glass by gumming just round the edge of the glass, the collodion might easily be applied, and as it makes the gelatine paper water-proof, it might be dipped in the sensitising bath. The least water, however, that touches it spoils its flatness, and makes it wrinkle up.

Reigate. T. Barrett.

REMEDY FOR OVER-EXPOSURE IN THE COLLODIO-ALBUMEN PROCESS.

Dear Sir,—Your correspondent, M. P. M., at p. 251 of the "Photographic News" asks, "how an over-exposed negative can be made a good one?" The following plan is at his service, and will be found to answer the purpose:—

When the picture is found to be over-exposed, stop the development as soon as the picture is well out; wash, and clear from the iodide of silver, and again wash. Then re-develop with pyro. and silver, which will produce *intensity* in the requisite degree and proportion. I am presuming, of course, that the picture has not been *very much* over-exposed, but only in that degree which, with ordinary treatment, would produce a flat, over-done negative.

J. Sidebotham.

OLD COLLODION FOR CLEANING PLATES.

Sir,—Much has been said about using old collodion for cleaning glass plates. I tried the plan the other day; I found the results to be perfectly satisfactory, as far as producing a clean plate went; but I would tell my brother photographers that I found it most injurious to the eyes ere I had cleaned a dozen, and shall never be induced to try it again for the mere sake of using up the old collodion.

E. Pepper.

SYNOPSIS OF PHOTOGRAPHIC PROCESSES.—PRINTING ALBUMENISED PAPER POSITIVES.

Float paper on exciting bath 3′ to 5′.
Hang up to drain.
Blot off.
Expose in frame.
Wash in water till no milkiness remains.
Immerse in toning bath 10′ to 15′.
Wash 4 to 5 hours in running water; then in boiling water.
Blot off and dry.

Exciting bath:—

Nitrate of silver	60 grains.
Glacial acetic acid...	½ minim.
Water	1 ounce.

Toning bath:—

Chloride of gold	1 grain $= a$.
Nitrate of silver	4 grains $= b$.
Hypo. soda...	1 ounce $= c$.
Water	2 ounces $= d$.

Dissolve c in $\frac{d}{2} = x$.

" a in $\frac{2d}{8} = y$.

" b in $\frac{d}{8} = z$.

Pour y into x, and z into the mixture.

H. S. I.

WHAT TO AVOID IN PHOTOGRAPHY.

Do not allow the nitrate bath to remain longer than necessary in a gutta percha vessel.

Do not add water or any aqueous solution to collodion.

Do not be always trying new processes before you have mastered one.

Do not be sparing of collodion when pouring it on.

Do not put down the stopper of a bottle until you are certain that it will lie in a clean place.

Do not attempt to print from a negative until it has been varnished at least two hours.

Do not use complicated formulæ until you are certain that equally good results cannot be obtained with more simple means.

Do not allow the hyposulphite bath for fixing paper positives to become old or acid.

ANSWERS TO MINOR QUERIES.

Quantities of Materials necessary for a Beginner to Start with.—*G. N. Dunn.* Our correspondent writes,—"There is one matter which, though he has looked well through all the pages of the 'Photographic News' up to the present time, he has not perceived that we have given beginners any well-defined idea about, and that is, the various chemicals used in the art, and the probable quantity of each that it would be well or prudent for them to order at first." We give the following, as containing what we consider the necessaries only, and in sufficient quantity to last for about 100 small sized pictures (4×5). Three ounces of crystallised nitrate of silver; half a pint of collodion; a quarter of an ounce of pyrogallic acid; four ounces of glacial acetic acid; half a pound of hyposulphite of soda; four ounces of alcohol; four ounces of good spirit varnish; three ounces of salt and tripoli plate-cleaning liquid. In addition to these, there will be required an apparatus; a camera, with slides, lens, stand, &c. complete; glass plates in boxes; gutta-percha bath and glass dipper; levelling stand; gutta-percha dish for developing over; one or two funnels; box of scales and weights; a one-ounce glass measure graduated into drachms; a few stoppered bottles of different sizes, from one ounce to one pint. One quire of best white filtering paper; yellow calico, paper, or glass, for admitting light into the dark room.

Preparation of Iodide of Cadmium.—*Churk.* To prepare this salt for photographic purposes, take 7 parts of metallic cadmium in coarse filings, and 8 parts of pure iodine. Place them in a flask together with sufficient spirits of wine to cover them well. Action will immediately commence, and the liquid will become very hot and perhaps boil. Add more alcohol as it evaporates; and as soon as the combination is complete, which will be known by the iodine having all disappeared, leaving a few grains of cadmium at the bottom of the flask, add more alcohol to dissolve any iodine of cadmium which may have crystallised out, and filter into an evaporating basin. Evaporate at a gentle heat, and the iodide of cadmium will crystallise out in the form of white nacreous plates. If the colour happens to be rather yellow, it will be removed by a second crystallisation. On the large scale the alcohol may be economically replaced by water, but for amateurs we recommend the employment of alcohol.

Colouring Scarlet Uniforms.—*R. W.* A very brilliant scarlet for a soldier's uniform may be produced by good colours on a good positive, if a little care and pains be given to the colouring. Use, as you say you have done, an alabastrine photograph, and varnish with the alabastrine varnish, colouring and varnishing alternately two or three times, if necessary, to obtain brilliance in colour. Then, finally apply a good coating of the scarlet, and varnish with the "penetrating varnish" advertised in our first page. You will by this means obtain a coloured non-inverted picture, with a brilliant scarlet viewed from either side. We have seen very excellent results produced by this method. With imperfect colours you will, however, only obtain something of a dull brick colour.

Gelatine Paper.—In answer to numerous inquiries we are enabled to inform our readers that this article will be shortly brought before the photographic world; arrangements being made for its supply in large quantities, and at a reasonable price. Our advertising columns will shortly contain full particulars.

TO CORRESPONDENTS.

Mr. Grubb's Patent Aplanatic Lenses.—*The agency for the above lenses has been transferred to Mr. E. Sutton, 204, Regent-street, W., who will in future attend to all orders connected with them.*

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

We must beg our correspondents not to send glass plates through the post, except they are securely protected against breakage.

T. L. G.—We do not recommend the addition of glycyrrhizine, or other organic matter, to collodion. It may temporarily improve a bad article, but will be almost certain to injure a good collodion.

M. Henry.—A very excellent method of transferring glass positives to glazed cloth, has been already published in the "Photographic News."

J. McL.—Attended to.

A Constant Reader.—1. It would answer very well. 2. It would require an *erecting eyepiece* to be used; a description of this would hardly be appropriate in the pages of the "Photographic News," but will be found in any work on optical instruments. 3. We are sorry we cannot help you.

W. B. N.—In speaking of so many *parts* of a substance in formulæ, it is understood that ounces, drachms, and grains *by weight*, are equal to fluid ounces, drachms, and minims *by measure*.

Bunyip.—1. Your contrivance is ingenious, but not so good as some in general use. 2. The bath is pretty good—not quite so easy to manage as the one at p. 86. Always wash before toning or fixing. 3. It would not be likely to answer.

S. T.—Writes as follows:—"I shall be greatly obliged if you can inform me if there are any departments of the public service—naval, military, or otherwise—where appointments as 'Photographer' are made. Photography is systematically taught at Addiscombe—Is there any staff, or person specially retained for that purpose? The Royal Engineers are, I believe, 'self-sustained,' employing non-commissioned officers for that purpose, but with very uncertain results. Are there any retained at the various observatories? In short, can you tell me if there is any way in which one who has spent much money in making himself an efficient photographer can practise the art profitably without 'taking likenesses?' I possess *interest*, but little capital."—We think there are such openings for able scientific photographers; but we know of no particular appointments at present.

H. T. T.—Received with thanks.

A Subscriber.—The position for the diaphragm, in your case, may be *in front* of the lens (single), and as far off as possible without darkening the corners of the picture. For a portrait lens, place the diaphragm close to the front lens.

Chloride.—1. You should have added acetic instead of nitric acid to your bath. Now, we fear, you can do nothing but make a new one. 2. Perhaps the free nitrate of silver has drained away from that part of the plate too much. 3. Not very well. 4. A ¼-plate portrait lens, fitted to a lateral sliding front, will answer for stereoscopic pictures.

Triptolemi's Curmudgeon.—1 and 2. We prefer the collodio-albumen process 3. See p. 86.

A Beginner.—A ball and socket movement on the camera-stand is very bad; as it is impossible with it to get sufficient steadiness. The height should be, so that the lens of the camera is on a level with the eye. 2. You must inquire at a shop where such things are sold. 3. Not easily.

Integer vitæ scelerisque purus.—1 and 2. Yes; if properly stopped down, but not so well as a single lens. 3. The aplanatic lens. 4. We never heard of the lens you mention. 5. We have seen some very good pictures taken by its means.

Hyposulphite.—Answered in the present number.

Mr. D. C.—Gelatine paper will shortly be advertised in our columns. We have never seen the ambrotype muslin.

Φ&c.—Cyanide of potassium will eradicate silver stains from articles of clothing; and if applied carefully, and well washed out immediately afterwards, it will not injure the most delicate fabric.

A Constant Reader.—Alabastrine photographs ought not to fade; see a query and explanation in a former number.

J. T. D.—Your arrangement is not so good as many which are in common use.

A. C. S.—The shorter the focus, the less range required to take pictures of a small size. 2. The colour you send would do for some purposes; but different coloured backgrounds are required to get the best effects. 3. They are over-exposed.

W. Phillips.—We think the cause must be owing to the silver having been too much washed off the plate before coating with albumen.

Soldier.—See answer to G. N. Dunn in this number.

Churk.—We believe the so-called crystal varnish, is a solution of gum benzoin in benzol.

An Amateur.—1. We prefer a twin-lens stereoscopic camera. 2. See the letter on the subject in our last number.

A. M.—Instantaneous photography is the most difficult branch of the art, and can only be successfully accomplished by those who have acquired great experience in manipulation. Of course all the materials must be of the best, and in perfect order.

H. P. D.—Try the government signal light; and burn it loose.

Communications declined with thanks:—J. Edward.—Amber.—F. A. X.—Hypo.—J. O. L.—M. M. M.—No. 3.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Paper.—K. T. N.—A Struggler.—Anti-H.—Printing Ink.—L. O. P.—S. E. L.—F. I. T. S.—A Correspondent.—Astro.—Φσοφός.—C. D. H.—Emmet.—A Painter (No).

In Type:—Churk.—Paper.—A Subscriber.—Viator.—H. F.—M. D.—W. R. S.—X.—G. E.—J. S.—An *Ex*-Member of the Council.—J. C. T.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 24.—*February* 18, 1859.

OCULAR DEMONSTRATION OF M. NIÈPCE'S DISCOVERY WITH RESPECT TO LIGHT.

WE have great pleasure in publishing the following interesting article from the pen of the Abbé Moigno:—

"The London Photographic Society has recently held its annual meeting under the presidency of the Lord Chief Baron, Sir F. Pollock, who is, at the same time, a member of the Royal Society. In the address delivered by the President, we remark the following passage:—'I regret to have to inform you that the hopes I gave you last year have not been realised, and that the experiments of M. Nièpce de St. Victor have not been repeated with success by any English experimentalist. I have heard that Mr. Hardwich and several others have tried the experiment and failed. . . .'

"On the other hand, Mr. Hardwich, who, as is well known, has repeated the experiments, has passed them over in utter silence in the new edition of his *Manual of Photographic Chemistry*, and, that he may not be reproached with this, he has taken care to say in his preface:—'Those who read the proceedings of the French Photographic Society will expect to find here a *résumé* of M. Nièpce's researches on a new action of light; but the author, after a careful comparison of the results with those previously obtained by Moser and other experimenters, has decided to leave the subject for further investigation.'

"From these facts, and many others that we might quote, it follows that, in England, the splendid experiment, we will say more, the grand discovery, of M. Nièpce de St. Victor is as if it had never been made. He is believed to be the victim of an unfortunate illusion. In this state of things they will be grateful to us if we relate what took place in the laboratory which M. Nièpce has contrived in the Louvre. Our friend wished Professor Wheatstone to see with his own eyes the curious experiment of his tube, or of a photograph made by light which had been stored up for several months. Mr. Wheatstone, the illustrious physicist, very willingly accepted the invitation. M. Nièpce took a tube containing a piece of pasteboard which had been impregnated with tartaric acid, insolated for a length of time, and rolled up in it, in the month of June last, and the tube then hermetically closed. He and Professor Wheatstone placed themselves in a dark room; M. Nièpce had a sheet of sensitised paper, on which he placed a piece of paper printed upon in large letters; he then opened the tube, holding it vertically, with the orifice downwards, and this orifice he placed on the printed paper which covered the sensitive paper; the tube was left in this position for about ten minutes, at the end of which time he removed it. The circle on the paper blackening in all its parts where it was not protected by the printed letters, at once visibly manifested the action of the light; the printed paper being removed, the characters were found to be very neatly traced in white, or forming a negative proof; this negative was treated like ordinary negatives, that is to say, it was fixed, and Professor Wheatstone placed it in his portfolio, to produce it before the Royal and Photographic Societies; a proof obtained by means of light that had been imprisoned for six months. The experiment, therefore, succeeded perfectly. Professor Wheatstone takes with him two tubes, one of which was placed in our hands on the 7th February, 1858, more than a year ago, the other closed in the month of June last, like that which was so efficacious under his inspection, and he will himself repeat the experiment in London before his illustrious colleagues, who will not then retain even the shadow of a doubt as to the reality of the persistent activity of the light.

"In short, every one may succeed whenever he wishes if he operates in the following manner:—Take a very white piece of pasteboard, steep it a sufficient time in tartaric acid, or in nitrate of uranium; the tartaric acid succeeds best and is more certain; expose the pasteboard to the direct light of the sun; leave it to saturate itself with light; you may conclude that this saturation is sufficient when a drop of nitrate of silver blackens instantaneously on contact with the pasteboard; then take it, roll it, enclose it in a tube of tinned iron; close the tube with solder, and preserve it if you will, indefinitely. You will thus always have a provision of light ready for such experiments as that of which Professor Wheatstone was a witness."

Since transcribing the above, we have been favoured by Professor Wheatstone with the picture taken in the manner described, and the distinctness with which the printed paper used as a negative is reproduced on the sensitised paper, is perfectly surprising. The action of the light, or whatever it may prove to be (for we are by no means convinced that it is light that produces the effect) is so energetic, that it extends beyond the edge of the orifice of the tube, and while the edge preserves the sensitive paper from the action of its contents on the paper immediately beneath it, a portion of the negative which is outside it is darkened.

We have also to announce another remarkable discovery of the same distinguished foreigner. Having prepared a paper with nitrate of silver and chloride of gold, he placed a negative upon it and enclosed the whole in a substitute for the ordinary printing frame, and submitted it to the action of *radiant heat;* the result answered his expectations. We have before us pictures obtained by him by these means, which are very distinct, even to the extent of reproducing legibly the inscription around a shield. We shall give a translation of M. Nièpce's paper in our next number, if it reaches us in time.

While on the subject of M. Nièpce's experiments, we may mention that Professor Wheatstone has brought with him to England specimens of photographs printed in different colours, as described in M. Nièpce's memoir, published in the "PHOTOGRAPHIC NEWS," of the 10th December of last year. They have an extremely pretty appearance, and are as clear and sharp as possible. The most beautiful is one of a reddish-brown colour, which, while it gives an agreeable tint to the picture, allows it to retain perfect whiteness in certain parts of it, as in the foam at the foot of the mill-dam.

THE SALE OF POISONS BILL AS IT AFFECTS PHOTOGRAPHERS.

From the number of letters we have received from correspondents, expressing their fears that serious obstacles will be thrown in the way of their purchasing some of the chemicals required in photographic manipulations, in the event of the Bill, introduced into the House of Commons by Mr. Secretary Walpole, Mr. Hardy, and Lord John Manners, passing into a law, we think it as well to state that their fears are groundless.

The Bill proposes that vendors of certain poisons, including some used in photographic operations, should be compelled to observe certain forms in vending them, but these in no degree affect the purchaser. There is no clause which says that the vendor shall be a chemist, consequently those who sell other photographic chemicals may sell the poisons specified also; and, inasmuch as every photographer must be personally known to some one or other of the vendors of these chemicals, it follows that he will obtain what he requires with the same facility as heretofore. The only persons among us who may experience a little annoyance in getting the poisonous chemicals specified, are beginners who may not be personally known to the vendor, in which case they will have to get a witness, of full age, who is known to him; and also photographers who are under age, who are not to be allowed to purchase them under any circumstances. Clause 5 runs thus:—

"No person shall sell any poison to any person who is unknown to the person selling the poison, unless the sale be made in the presence of a witness of full age who is known to the person selling the poison, and to whom the purchaser is known; and no person shall sell any poisons to any person *other than a person of full age*."

Now, as a very large number of photographers are under full age, it is obvious that, if the Bill be passed as it stands at present, it will compel these to evade the law, a thing which might be accomplished easily enough, but which, for manifest reasons, would be highly objectionable. What we would suggest, therefore, is, that a clause should be added to the Bill, *enabling vendors of photographic chemicals to sell any of the poisons included in schedule A to persons whom they know to be engaged in the practice of photography, even when they are under age.*

The following clause is that which chiefly affects purchasers generally:—

"Every person who sells any poison shall forthwith, and before the delivery of the same, enter or cause to be entered, in a fair and regular manner, in a book or books to be kept for such purpose, in the form set forth in the schedule to this Act or to the like effect, the following particulars of and in relation to such sale; (that is to say,) the date of the sale and delivery and the name and quantity of the poison sold, together with the name, surname, place of abode, and condition or occupation of the purchaser, and the purpose for which the poison is required; which particulars, so far as they are not within the knowledge of the seller, he is hereby authorised and required to inquire into of the purchaser, before the delivery of the poison; and in every case before the delivery of the poison such entries shall be signed by the seller and by the purchaser, and (where the sale is required to be made in the presence of a witness) also by the witness, who shall add his place of abode."

There is another possible grievance, and that is:—in the event of a photographer travelling about the country taking pictures, as many hundreds do in the summer months, being out of one of the poisons enumerated in the Bill, say cyanide of potassium, for example; although this may be absolutely essential for the continuance of his operations, he will be unable to obtain it, and the whole end and aim of his journey be entirely defeated. This difficulty would also be obviated by the modification suggested above.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

On the Preservation of Sensitised Sheets.—If the different causes we have passed in review exercise remarkable influences on the definitive value of the proof—influences which the photographer ought always to bear in mind—there is another effect which should fix his attention in the highest degree: we allude to the alteration which the positive papers, prepared with nitrate of silver in the ordinary manner, undergo, in a variable, but generally very short, period of time—an alteration which rapidly renders them unfit for the production of a proof. Everybody knows that sheets thus prepared can only be preserved a few days even in darkness.

Positive papers prepared by peculiar methods—those with the chromates, for example—do not present this inconvenience to the same extent; they remain very much longer without alteration: but, independent of the drawback, that their use requires a fresh apprenticeship on the part of the photographer, they have none of them hitherto given such admirable results as the papers prepared with the nitrate of silver.

The alteration we allude to does not always manifest itself with the same intensity; it varies with papers of different manufacture; it varies even with sheets of the same origin. Let us first examine what may be the cause of this alteration. In the preceding part of our article, we have shown that the surface of the sensitised paper was formed by the mixture of two very distinct bodies—the insoluble chloride of silver, and the soluble nitrate of silver, employed in great excess, and remaining free on this surface. We have shown, moreover, that both the one and the other were requisite for the production of a good proof, and that it was only on the condition of their existing on the same sheet that effects of relief could be obtained upon it, as well as the half-tones, to which photographers attach so much importance.

The existence of these two different bodies on the surface of the sensitive sheet, naturally led us to examine if both of them intervened in the phenomenon of the alteration, or if one alone was the cause. Experiment has shown us the truth of this latter supposition; and we have found that, a sheet of sensitised paper being divided into two portions—the one remaining in its normal condition, the other well washed, so as to free it from the excess of free nitrate—that the latter portion, which then contained nothing but an insoluble chloride, retained its qualities in darkness for an indefinite period, without undergoing any alteration: as to the other half—that is to say, that which contained an excess of free nitrate—it began to change after the lapse of a few hours, and after three or four days was totally unfit for use. Besides, this preservative faculty of the chloride of silver remains constant, however the papers may be charged with this compound. Thus, in a series of experiments which lasted fourteen days, we have seen the parts of a sheet which contained an excess of free nitrate become tinted at the end of a few hours, and deepen rapidly; while the other parts, prepared on salt baths of 2, 5, and 10 per cent., which consequently were highly charged with chloride, freed from the excess of free nitrate by washing, were preserved all this time without any trace of alteration.

It seems, then, from this fact, that we may easily find the solution of the problem of the preservation of the sensitised papers in preparing them with chloride of silver alone, either by washing them after the nitrate bath, or, on removing them from this bath, by passing them in a solution of a soluble chloride, which would convert all the free nitrate in excess into an insoluble choride of silver. We do not believe, however, that this process would be applicable; we should obtain in this way, indeed, papers which would retain their qualities without alteration, but they would be unsuited for giving pictures of a high quality. We have shown, in fact, and

* Continued from p. 266.

every photographer has had the opportunity of verifying the fact for himself, that proofs with chloride of silver alone, without free nitrate, were always bad and incomplete.

It is therefore clear that the alteration of positive papers in darkness, is due to the action of the free nitrate of silver on the organic matters which form the body of the paper. Secondary causes may accelerate its activity: thus, the alteration will be so much the more rapid, as the nitrate may have been employed more concentrated, the degree of its penetration into the body of the paper greater, the time of contact more prolonged, and, finally, according to the tendency of the size used to combine with the nitrate of silver; circumstances, all of which our previous researches, joined to the observation that the free nitrate is alone the cause of alteration, render easy of explanation.

In fact, if the nitrate of silver is more concentrated, the sheet will contain, as we have demonstrated, more free nitrate, and hence be more susceptible of alteration. If the length of the pose on the bath has been greater than usual, the cause and effect will be the same; on the contrary, the richer the salt bath, the less free nitrate there will be, and the less the tendency of the paper to change.

(*To be continued.*)

COLLODION.

BY P. C. DUCHOCHOIS.

Collodion is a solution of pyroxyline in a mixture of ether and alcohol, to which is added, for photographic operations, a small quantity of soluble iodide, of bromide, and sometimes also of chloride.

In principle, the ether gives the *solidity* of the collodion film, and the alcohol adds to its sensitiveness, and to the softness of the proof, by destroying the tenacity that the ether gives; however, it will be dangerous to force the proportion of alcohol, for a little solid, glutinous, and unequal film will be the result. The presence of alcohol is also necessary to dissolve the pyroxyline, iodide, or bromide, which are insoluble in absolute ether, and to prevent a too quick evaporation of the collodion that opposes the formation of an equal film, free from striæ.

If the amount of alcohol employed to prepare the collodion is too small, the iodide and bromide of silver, instead of being formed in the body of the film, are entirely formed upon its surface, and easily washed away. The same effect is also produced by a too weak silver bath; and, if it is concentrated enough, it will be necessary to add a few minims of acetic acid even when the bath is not alkaline, and does not give any reduction; the acid in that case appears to help to accelerate the combination of the iodide and bromide with silver. Sometimes, also, a collodion prepared with iodide of ammonium produces the same kind of imperfection; then the addition of a few drops of water is often a good remedy.

To prepare photographic collodion, neutral and anhydrous sulphuric ether only must be employed, containing little alcohol, and newly distilled from potash, in order that it may be free from oxidation, and from that peculiar property, which it acquires by long keeping, of decomposing the metallic or alkaline iodide and bromide of the collodion. The alcohol must be very concentrated, and well purified from any essential oils which destroy the sensitiveness of the preparations. However, its specific gravity ought not to be over 0·809, for an anhydrous collodion is far less sensitive than when it contains a little water, 2 or 3 per cent.; a larger quantity will give a collodion not very fluid, and a wavy film, liable, after fixing, to tear or peel off in drying. The proportion of alcohol and the quantity of pyroxyline vary according to the temperature; the higher it is, the more the quantity of alcohol augments—the lower it is, the larger must be the proportion of pyroxyline. The dose of iodide in the collodion must be proportioned in such a manner that the sensitised film presents, by transparency, a deep opal colour, through which it is impossible to read, although it is easily penetrable to light; for an opaque film is not very sensitive, and gives grey proofs (too equal); on the contrary, a film too little iodised gives too much vigour (contrast). In good conditions the collodion contains about one per cent. of iodine combined with a metallic or alkaline base. If a bromide is employed, its addition does not affect sensibly the proportion of iodide, and the quantity varies, according to the effect required, from 1·6 to 1·2 of bromide for one of iodide.

The thickness of the collodion depends on its preparation and the manner of bringing out the picture. With a collodion prepared only with iodide, and but little iodised, or in developing with pyrogallic acid, thin films are preferable; those a little thick give better results, and more intense negatives, with a collodion bromo-iodised, or when the sulphate of protoxide of iron is the developer used. The density of collodion depends also on the size of the glasses to coat—the larger they are, the thinner ought to be the collodion, since the evaporation being more considerable on a larger surface than a small one, the collodion leaves necessarily a thicker film. The progressive decomposition of collodion is determined by the acidulation of the ether resulting from its oxidation in contact with the oxygen of the air, or with a powerful oxidising base, such as potash, soda, ammonia—either if they are in excess in the iodide and bromide, or even in combination with them. It is also to be observed, that these bases react equally on the alcohol, and decompose it. On pyroxyline the action of the alkalies is very powerful; it is partly decomposed; the collodion becomes very fluid, and gives a thinner film, like rotten collodion, often opaque, and with less and less body. The acidulation of the ether determines the decomposition of the iodide; iodine is set free, reacts on the ether and alcohol, and gives birth to new compounds (iodoform, hydriodic, and iodic acid, &c.), which brings about the complete deterioration of the collodion.

By way of decomposition, the collodion loses its fluidity (if prepared with alkaline compounds), and forms a film thinner, having less body and powdery, and gives more intense and vigorous proofs—a property that it loses afterwards, and becomes less and less sensitive. The insensitiveness is easily explained by the fact that the iodic acid, at the time of rendering sensitive, is transformed in the body of the film to iodate of silver; it may also be explained by the formaion of nitric acid, which takes place every time that free iodine, iodic, and hydriodic acids are in contact with nitrate of silver. The augmentation of intensity would be in part the result, according to Mr. Hardwich, of the formation of an organic compound (formed by decomposition of the pyroxyline in presence of alkaline iodine *) containing some elements of the pyroxyline combined with a base, and having properties, like those of sugar, to form organic compounds with the salts of silver, reduced by light. According to Mr. Maxwell Lyte, that would be owing to the presence of nitrous ether, formed by the nitric or nitrous acid, mechanically held in the fibres of the pyroxyline: and it would not be unlikely, that this augmentation of intensity and vigour would be also determined by some acetate resulting through the decomposition of the iodide, which leaves the base in presence of the acetic acid of the ether. The same causes which produce the decomposition of the iodides, produce also that of the bromides, and the deterioration of the collodion rendered so much more active by it—as free bromine reacts on ether and alcohol more quickly than iodine in forming like compounds.

The metallic iodides and bromides, as well as the alkaline, are decomposed in the collodion either by the oxidation of the ether in contact with the air, or the acid in excess in the pyroxyline, or by reaction of the ether on the metal; for it is well established, that not only do potassium, sodium,

* Is it not the alkaline base that forms this organic compound? If to a plain collodion, modified by ammonia, and a few days old, some iodide is added, one obtains immediately a photographic collodion, having the property of giving intense negatives.

barium, oxidise in ether, but that some metals undergo the same effect in presence of the air. The deliquescent metallic iodides and bromides are not generally very stable, and are easily altered by the air and dampness (such are the iodides and bromides of magnesium, zinc, iron, &c.), and give a collodion which does not keep as well as with other metallic iodides. It must be also remarked that, contrary to the alkaline, these iodides and bromides, and even those of cadmium (which produce the most unalterable collodions), produce a thickening of the collodion, giving a more or less wavy film, before any apparent decomposition takes place.

The collodion is more quickly decomposed by iodide of iron than by any other metallic iodide; it thickens in a little time, and becomes like a jelly in two or three days if the proportion of iodide of iron is large. It is at least worthy of remark, that the pyroxyline is rapidly altered in a collodion prepared with pure iodine; this seems to confirm that theory which admits that, like the proto-salts of iron, hydriodic acid reacts on pyroxyline, and regenerates the cellulose. Heat hastens the decomposition of collodions. The action of light has been studied by M. Tiffereau, who observes, that a collodion exposed to the direct rays of the sun during one to three days acquires great fluidity and sensitiveness, and is able to give instantaneous proofs even in an unpropitious condition of light, but that it afterwards loses these properties, and becomes worthless in a few days.

CONCLUSIONS.—*A.* In the preparation of photographic collodions—1. To employ ether and alcohol perfectly neutral, and newly distilled on caustic potash. 2. To neutralise, by washing with *very weak** ammoniacal water, the acid that the pyroxyline may retain between its fibres, and to dissolve it only at the moment of preparing the photographic collodion. 3. To keep the collodion in well-corked bottles without emptying, and sheltered from light and too great heat. 4. When the collodion assumes a coloration, turning to red, to put in it some thin pieces of pure cadmium, to which the iodine and bromine combine in proportion as they are set free.

B. For very fluid collodions, to iodise with alkaline iodide and bromide. This collodion will not keep a long time; but when the decomposition is not very advanced, it will work as well as any other.

C. To obtain a collodion, giving a powdery, rotten film,† as required for dry processes, to add a few drops of ammonia: the decomposition of the pyroxyline being very rapid, the collodion will be worthless in a week or two even with a little amount of alkali.

D. To prepare very stable collodion:—1. To proscribe any alkaline iodide and bromide, especially those containing an excess of base and the iodide of ammonium, which, by its instability, retains always iodine and releases ammonia; to prefer metallic iodides and bromides, with the exception of those of iron. The iodide and bromide of cadmium give the most stable and quick collodion.

INSTANTANEOUS PHOTOGRAPHY.

BY C. A. SEELEY, ESQ.

FOR ordinary photographic works no more sensitive preparations than those commonly employed are needed. Most persons who sit for a portrait can keep still ten or twenty seconds. Photographic effects are more under our control, and otherwise more satisfactory, when the time of exposure is easily counted.

Yet every photographer, at some time, feels the want of a more rapid and certain process than any now in use. For moving objects, as in a sea or cloud view, the common methods do not answer well, and especially for taking portraits of children or nervous persons, we want to make an impression instantaneously.

Collodion, prepared with iodide of iron, has been found to be the most sensitive of all photographic preparations. Such collodion, however, has not come into general use, from the fact that the bath, after the dipping of two or three plates, becomes unfit for use; the collodion also deteriorates more rapidly than any other. If these objections to the use of iodide of iron can be removed or obviated, it would soon come into favour. The following plan I consider a fair solution of the problem:—

The derangement of the bath cannot be prevented, but if its good qualities can be immediately restored after the derangement, our purpose is effected. For a method of recovering the bath, expose the nitrate of silver solution in a colourless glass bottle, to the sunlight. The theory is evident. By the action of light, the nitrate of silver destroys and precipitates the injurious matter. When the operation is complete the solution is perfectly colourless, and devoid of smell. The time required for the exposure would evidently depend upon the condition of the bath and intensity of the light. If the impure bath is already acid, it should be made neutral by carbonate of soda or potash, before the exposure.

In this case the remedy of exposure to light is peculiarly prompt. The rectifying the bath may not require more than ten minutes, when it is again fit for use. It would be advisable in many cases to have two or even three bath solutions, so that while one is being restored another will be in working condition. To lessen the expense, the bath-holder may be very narrow, so as to cover the plate with a small quantity of solution. As to the collodion, I would recommend that a stock of plain collodion should be kept on hand, well settled, and that only a small quantity be sensitised at the same time.

Critical Notices.

The Panorama of Lucknow in the Photographic Exhibition.

SINCE we wrote our notice of the Photographic Society's Exhibition, there has been added to it a most interesting and clever Photographic Panorama of Lucknow, together with some other photographic landscapes and portraits.

Of all the panoramas we have seen, taken by means of photography, we have no hesitation in stating that this is one of the most perfect. The copies exhibited at the Exhibition, we may state, however, are by no means such clear impressions as we have seen from the same set of negatives. One thing which must strike every one who looks at these photographs is, the great uniformity of tone, which is so perceptible throughout the pictures. Not only is there great effect produced in looking at these pictures as a whole, but closer inspection only reveals new beauties. In many parts of this photograph, one is almost led to think that it is a copy of a panoramic picture, as there are such pretty little patches of trees and shrubs clustering here and there. As an architectural photograph, the panoramic view of the Kaiser Bagh is most interesting: we are informed that this large photograph, though representing an immense area, is only of a portion of the building which constitutes one palace. If this is a portion, what must be the whole?

To get an idea of the extent and splendour of Eastern palaces, of which we have read so much—not only in fairy tales, but in the more interesting contributions of "our own special Correspondent," we would advise anybody to go and see this photograph; it strangely contrasts with the blotched and blurred copy which Mr. Frith exhibited of Cairo. The other Indian views are of a highly jaundiced tone; this, perhaps, is owing to the great amount of varnish on them. Of the portraits—we cannot say much, they strike us as being very much like the well-known series of Crimean photographs by Fenton. The landscapes are very cleverly executed; and the sites are most artistically selected. "The great Emambara of Ashnifoodowlah," is a very beautiful photograph; and has many points about it of photographic as well as historic interest. Many of these views, we understand, are by Robertson; who is at present engaged in taking photographic pictures of the most interesting scenes and places connected with the war in India.

* A too strong alkaline solution will render the pyroxyline insoluble.

† Old brown collodions, prepared with alkaline iodide, possess such properties.

Stereoscopic Views in the North of England, and in Wales.—By Messrs. OGLE and EDGE, Preston.

THESE gentlemen deserve the thanks of the artistic, for the very excellent series of views they have published. They consist of English lake scenery, Welch landscapes, and English ruins. Of the quality of these slides there cannot be two opinions; they are clear, well defined, and, in many cases, very brilliant. Perhaps the only fault that can be urged against them is, a slight reddishness of tone. In some instances this is more agreeable than otherwise; but, generally speaking, we should prefer the red a little more subdued. "The Dungeon Ghyll, Langdale Pikes, Westmoreland," is a most vivid and beautiful picture. "Near Stock, Ghyll Force, Ambleaide," is a wonderful specimen of clear printing; and, at the same time, it exhibits a great amount of detail in the foliage, while the water, as it rolls over the rocky bed of the river, is caught with great and striking force. But of the lake scenes, the best is "Rydal Water, with Hartley Coleridge's Home and Nab Scar in the background." The rendering of the water in the picture is really beautiful, while the background is clear and distinct; the whole picture seems, as it were, the very embodiment of tranquillity. In giving a happy illustration of "The brook that brawls along the wood," Messrs. Ogle and Edge have been eminently successful in the selection of a spot that exactly represents the idea. It is a charming little picture. We will not go into particulars with regard to the other slides before us; suffice it to say, that the views of Tintern, Rievaulx, and Fountains Abbey, are done in a manner that would bear comparison with Bedford's best and happiest views. Of all the views we have ever seen of "Tintern Abbey," we have no hesitation in saying that the view from "The North Aisle, looking West" (No. 4), is one of the best. It gives the spectator such an idea of distance, and impresses him with the grandeur of the building in a manner that cannot easily be forgotten. This series contains the most choice and beautiful views that we have seen. They are very artistic; and the selection of sites has been most careful and judicious.

Lessons on Colouring Photographs.

RELATIONS AND HARMONY OF COLOURS.

WE have been speaking hitherto simply of the contrasts of complementary hues and the harmony resulting therefrom. There are, however, other contrasts pertaining to these complementary relations, arising out of the effect of colours in regard to perspective, *chiaroscura*, and warmth or coldness.

In relation to perspective, blue, which is the least positive of the primary colours, is called the most retiring colour, as it recedes most from the eye, and is the best representative of distance; whilst orange, its complementary, is the most advancing colour. The student may easily convince himself of the fact of these characteristics by placing an object coloured blue and another coloured orange, both colours having the same relative intensity, side by side, and then retiring from them to some distance; he will find that the blue is much the soonest lost to the eye and mingled with the distance, whilst the orange at the same time is vivid and distinct. The same characteristics will, of course, pertain to the compound colours which are most nearly allied to these respective hues. As regards black and white in this respect, black is the most retiring, white the most advancing.

In respect to light and shade, setting aside black and white, which, as we have before said, are not regarded as colours, yellow is the most luminous colour, or the most nearly allied to light, regarding light simply as an illuminating agency; whilst purple, its complementary, is most allied to shadow, and is the deepest pure hue. Of the uncompounded or elemental colours, blue is the representative of shadow, and yellow of light, whilst red, occupying an intermediate position, is analogous to grey the intermediate of black and white.

Blue, as well as being the most retiring colour, is at the same time the coldest—all colours being cooled by distance. Orange, its complementary, is the warmest of all colours; and so in regard to the semi-neutrals, they are warm or cold just in the degree that their component parts partake of these full hues.

Red and green, which do not contrast as to light and darkness, do so to some extent as to warmth and coldness, the more so as the red may incline to orange as in scarlet, and the green to blue. The special contrast of this pair is, however, that red is the most positive and exciting of all colours, and green the most quiet and soothing.

Besides these contrasts of colour with colour, a special influence is exercised by the contrast of intensity in the same colours, and by black and white in juxtaposition or combination with them. Two tints or shades of the same hue of different degrees of depth placed side by side, appear at once in a modified intensity; the deepest gaining additional depth, and the palest appearing still paler; this modification appearing most marked at the points of contact. Any colour having a luminous complementary, gains in richness and intensity by contact with white, as indeed to some extent do all full hues; but broken tints of any colour luminous in itself suffer by contact with white. On the other hand black should not be opposed to colours which have a luminous complementary, as both must inevitably be impoverished by the contrast; whilst any colour having a dark complementary, and of course, more or less luminous in itself, will gain by the proximity of black, which also is enriched by the luminous contrast. Thus, blue or purple, and all colours nearly allied to them, would suffer in depth if placed in contact with black, whilst the black itself would be tinged with the complementary orange or yellow, and assume a rusty tone. White, on the other hand, placed in juxtaposition with similar colours, by assuming a tint of the same complementary hues, would enrich the blues or purples, or analogous colours. Black placed in contact with orange, yellow, or red, and similar colours, would itself be enriched, assuming something of the blue, purple, or green tone complementary to these hues, and would at the same time by its contrast give brilliancy to these and analogous colours. The effect of a neutral grey is good on all full hues, which give richness and intensity by contrast.

In the compounding of colours on the palette it must ever be remembered that the effect is altogether different to that produced on the eye by their juxtaposition in a distinct unmixed form, in however small portions, as in hatching or stippling, or by their superposition, as in glazing. White, it must be remembered, when mixed with any colour, always mars its transparency, and hence the horror which the great master of colouring, Rubens, expressed against the slightest admixture of white in shadows, which should always possess the utmost transparency. Black mixed with any colour always detracts in such degree from its purity and brilliancy.

We may here remark that any discordance or want of harmony in colouring is most apparent where the colours are used in their full intensity; and the purer the tints, when harmoniously combined, the more beautiful the effect. There are cases, however, in which, from colours inherent in the model and absolutely necessary to the picture, it becomes necessary to introduce a mass of one colour, which disturbs the harmony, as in the case of a soldier's uniform: in such case the discordance will be less marked and offensive if the prevailing colour be kept as low in tone as possible, and as much as possible in shadow. Obscurity may thus to some extent conceal the want of harmony; but should never, notwithstanding the example of some great painters, be substituted for it.

(To be continued.)

OUR readers will regret to hear that M. Canson, the paper-maker, at Annonay, whose name is so well known to photographers, has recently met with a severe misfortune. The whole of the paper and rags, &c. on his premises, amounting in value to £25,000, were totally destroyed by fire. Like most of the fires which take place in paper mills, it commenced in the rag warehouse, and is supposed to have been accidental.

Photographic Chemistry.

CHEMICAL MANIPULATIONS—*(continued)*.

Reduction (continued).—Perhaps a better, as well as a similar, result may be obtained, by effecting the reduction of the sulphide of silver by means of saltpetre. The mode of proceeding in this case is, to dry the sulphide of silver in an iron pot, in a fireplace which has a good draught, until the sulphur begins to burn—the evaporation of the moisture being accelerated by stirring. When quite dry, the black residue is taken, little by little, and submitted to a temperature which must not exceed a dull red heat; the sulphur will take fire anew, and burn until the greater part of the sulphur is consumed, and the black mass which remains is sensibly pure sulphide of silver. During the operation the matter should be constantly stirred and crushed with an iron spoon.

It is extremely important that the substance should be heated for a sufficient length of time to consume all the sulphur in excess, otherwise a detonating mixture will be formed by its union with the saltpetre which may give rise to serious accidents: at the same time care must be taken not to exceed a dull red heat, in order to avoid the melting of the sulphide of silver, which would, in that case, be exceedingly difficult to pulverise—an operation which must be performed as soon as the whole has been baked sufficiently, and intimately mixed with a like quantity of pulverised saltpetre. While this is being done, a crucible, placed on a smelting furnace, is heated to redness, and the mixture ladled into it by means of an iron spoon, each spoonful being only added when the preceding spoonful is completely fused, in order to avoid loss from deflagration, which might cause projection of the mass out of the crucible. When the crucible is full, the fire is a little strengthened for about half an hour, that the mass may be rendered thoroughly fluid; after which the grains of silver will collect together at the bottom of the crucible, and the flux will float on the surface. When the operation is finished, the fire may be extinguished, and the crucible left to get cold to prevent the possibility of accidents; after which it may be broken, and the ingot of silver taken out.

These methods of proceeding, which are by no means complicated to read, are still simpler in practice. It may be objected to them that they give rise to a sulphurous odour; but this odour is less hurtful, and more easily endured, than the nitrous acid and chlorine vapours which are given off in using aquafortis, or than the vapours of hydrocyanic acid, which are given off when cyanides are treated with acids. The expense for apparatus is very trifling, the principal item being the smelting furnace, which would not cost more than fifteen shillings, and would be available for other purposes than that described, and the cost of the fuel would not be one hundredth part of the value of the silver it would smelt.

Sensitised paper cuttings, spoiled sheets, and, generally, all papers which may be supposed to contain silver, should be reduced to ashes, and the ashes mixed with an equal weight of dry carbonate of soda, to which must be added a little saltpetre, and the whole melted in a crucible heated to a strong red heat. When cool, the ingot of silver will be found at the bottom of the crucible.

If it be desired to prepare this silver so as to use it in manufacturing nitrate of silver, it should be melted in a crucible; and while the metal is in a state of fusion, the crucible should be seized, carefully and firmly, with a pair of pincers, and the contents emptied into a pail of water from a good height; the result will be, that the metal will be divided into small granules. If this granulated silver contains any portion of gold, it will be liberated when the silver, with which it is alloyed, is attacked by the pure nitric acid, and dissolved, and the gold will be deposited, at the bottom of the capsule, in the form of a black powder.

(To be continued.)

Dictionary of Photography.

BICHROMATE OF POTASSA.—A beautiful red-coloured salt, crystallising in anhydrous four-sided prisms. It is composed of two parts of chromic acid and one of potassa. It is prepared by acidulating the neutral chromate with sulphuric acid, and allowing the solution to crystallise. It reddens litmus paper, and is soluble in ten times its weight of water. Its application to photography was first made by Mr. Mungo Ponton. Paper, immersed in a solution of bichromate of potassa, is powerfully and rapidly acted on by light. This paper is not sufficiently sensitive for the camera, but answers an excellent purpose of taking drawings of dried plants or copying prints. To effect this, give the paper a sizing of starch; steep it in a weak solution of iodine; and then wash it in a large quantity of water, when it will take a very fine blue tint. If this is not uniform, the paper must be re-sized, and again soaked and washed; it is then soaked in a concentrated solution of bichromate of potassa; the superabundant moisture taken off with blotting paper, and dried thoroughly by the fire. When the copy is obtained, it is washed, dried, and steeped in a weak alcoholic solution of iodine for fifteen or twenty minutes, and carefully dried with blotting paper. If the drawing is not sufficiently distinct, this soaking and drying may be repeated; and if a layer of gum arabic be applied while still wet, although it at first loses a little of its tone, it is greatly improved when dry. In combination with gelatine, or an analogous body, bichromate of potassa forms the basis of Mr. Fox Talbot's patented improvements in photographic engraving, a principle which is now being so plentifully re-discovered both at home and abroad, under the title of carbon printing, nature's engraving, &c. &c.

BICONVEX.—Having two convex surfaces; *i. e.*, a biconvex lens is bounded by two convex spherical surfaces, whose centres are on opposite sides of the lens. Parallel rays of light passing through a biconvex lens are rendered *convergent*.

BICONCAVE.—Having two concave surfaces; *i. e.*, a biconcave lens is bounded by two concave spherical surfaces, whose centres are on the same sides of the lens. Parallel rays of light passing through a biconcave lens are rendered *divergent*.

BISMUTH.—A pinkish white metal, very brittle. *Pearl powder* is a subnitrate of bismuth. It enters into the composition of the so-called fusible metals. The following table of the composition of some of these alloys may be of interest:—

	Bismuth.	Tin.	Lead.	Fusing Point.
Newton's Alloy...	8 parts.	8 parts.	5 parts.	202° Fah.
Arcet's Alloy......	2 "	1 "	1 "	199·5 "
Another	5 "	2 "	8 "	197 "
Another	8 "	8 "	8 "	197 "

BITUMEN OF JUDEA.—(See *Asphaltum*, p. 247.)

BROMINE.—An elementary body, discovered by M. Balard, in 1826. It is obtained by passing a current of chlorine through the liquid which remains after the evaporation of sea water to obtain common salt. This liquid is commonly called bittern, and usually contains sulphates and chlorides of sodium and magnesium, with a small quantity of bromide of magnesium. When the chlorine is passed through the bittern, it assumes an orange tint in consequence of bromine being set free from its combinations, the chlorine uniting with the magnesium of the bromide of magnesium, and forming chloride of magnesium. The liquid containing the free bromide is then agitated with ether, and the mixture is allowed to stand until the ethereal portion holding the bromine in solution floats on the surface. This is then carefully poured into another vessel, so as not to disturb the residuum, and agitated with a solution of potassa, by which means bromide of potassium and bromate of potassa are formed. The whole is then evaporated to dryness, and submitted to a

dull red heat; the residuum is then powdered, mixed with pure peroxide of manganese, and placed in a retort; sulphuric acid diluted with half its weight of water is now poured in. Red vapours immediately arise, and condense into drops of bromine, which are collected by plunging the neck of the retort to the bottom of a small receiver containing cold water. The bromine forms a stratum beneath the water, and may be collected and further purified by distillation with chloride of calcium.

Bromine is liquid at the ordinary temperature, of a deep reddish colour, and an insupportable irritating odour similar to chlorine. It freezes at 4°; boils at 116°·5; is about three times as heavy as water; is very soluble in ether, less so in alcohol, and very slightly so in water. It is a poison which acts very powerfully on the organs of respiration, and the greatest care should therefore be taken to guard against the inhalation of its vapour. Bromine is one of the most important agents in photography, but its value is hardly appreciated yet by the generality of operators.

(*To be continued.*)

A Catechism of Photography.

THE REMOVAL OF COLLODION FILMS.

Q. Is it possible to employ any substitute for glass in the collodion process?

A. It is, as the various experiments which have been made from time to time, in order to ascertain this important fact, have resulted successfully.

Q. How are these results obtained?

A. By the use of a prepared film on the glass, which can be readily and perfectly removed, so that the same glass may be used frequently. The film adheres firmly to the glass during the preliminary operations and the taking of the image, but can subsequently be removed without injury.

Q. What mediums are used for this purpose?

A. Gutta percha, which possesses the good qualities of glass in its great transparency and evenness of surface. At the same time the cohesion is perfect, and the cost trifling.

Q. By whom was this process invented?

A. The invention is claimed both by Mr. Archer and Mr. Reade; the former took out a patent for the use of the substance, while the latter published the process in a journal devoted to the art.

Q. How is this process conducted?

A. The gutta percha is dissolved in benzol by the application of heat.

Q. What is benzol, and how is the heat applied to it?

A. Benzol is one of the hydro-carbons of coal tar naphtha; and immersing the bottle which contains it and the gutta percha in hot water, is sufficient to render it soluble.

Q. How is the solution applied to the glass plate?

A. By pouring it on and immediately drying it over a spirit lamp.

Q. Does the medium adhere to the glass?

A. Perfectly; and has no tendency to separate from it on subsequent immersion in the nitrate bath.

Q. When the medium is firmly attached to the glass, how is the process continued?

A. In precisely the same way as though the gutta percha were the glass itself; it is then covered with collodion, iodised and sensitised in the usual way, developed, fixed, and varnished.

Q. When the process is complete, how is the gutta percha disengaged from the glass?

A. The point of a penknife is passed round the edge, it is then placed in water for a minute or two, and the gutta percha separates with great facility from the glass. When dry, place the film between two pieces of paper, cut it to any required size, and you have a negative ready for the printing frame, as valuable in every respect as the glass negative.

Q. Does not the gutta percha dissolved in benzol have a tendency to become opaque?

A. It does, but this defect is prevented by dissolving the benzol film when dry in chloroform, and then using the chloroform film for the proposed purpose.

Q. Why is this preferable to the gutta percha alone?

A. Because it is certain, under all circumstances, to retain its perfect transparency.

Q. Is the process described that which was introduced by Mr. Reade?

A. It is,—but agrees in all essential particulars with Mr. Archer's plan.

Q. What is Mr. Archer's plan?

A. This gentleman has included in his patent two methods of applying the solution of gutta percha. The first method is thus stated: Pour on the clean glass plate a quantity of the solution of gutta percha in a similar manner as for coating the glass with a film of collodion. When this film is dried, the iodised collodion is poured on and immersed in the silver bath. The plate is exposed, developed, and fixed. The glass plate with gutta percha and collodion film attached to it is immersed in cold water, which presently causes the two combined films to separate readily from the glass. The second method is: Prepare the glass with iodised collodion, and proceed with the process in the ordinary manner. When the collodion picture is dried, pour on it the solution of gutta percha; when the plate is covered, hold it in a horizontal position for about a minute to thicken. Draw off very gently through a funnel into the bottle the excess of solution, and gradually raise the plate vertically over the funnel.

Q. What is the result of this process?

A. The benzol rapidly evaporates, leaving on the collodion picture, and in close contact with it, a coating of gutta percha. The back of the plate may then be held towards a clear fire, in order to hasten the hardening of the gutta percha. It must subsequently be immersed in cold water, when the combined films separate in one sheet from the glass; that is to say, the collodion picture is removed from the glass with the coating of gutta percha.

Q. Is the collodion picture so removed capable of being used?

A. It is; being in every way as perfect as when in the glass.

Q. Is the glass itself uninjured by the process.

A. Yes; and may be used again after the ordinary cleaning.

Q. Are not other media used for the removal of collodion films beside gutta percha?

A. Yes; paper prepared for the purpose is frequently employed.

Q. How is the paper prepared?

A. Sometimes with albumen and sometimes with gelatine.

Q. How is the paper prepared with albumen?

A. By being dipped in a bath of albumen, formed of white of eggs beaten up and then allowed to settle; the paper should be allowed to remain three or four minutes in this, then be thoroughly dried for future use.

Q. How is the albumen paper used in removing the picture from the glass?

A. It is applied to the glass after the picture has been fixed, and by a free application of water the film is dislodged from the glass and attached to the albumenised paper.

Q. How is the gelatine paper prepared for this purpose?

A. By floating it on a bath prepared in the following proportions: one ounce and a half of pure white gelatine to a quart of distilled water.

Q. How is the gelatine paper to be applied to the glass?

A. While the negative which is to be removed is still wet, the glass should be placed in an horizontal position, the collodion upwards, and covered with an even sheet of water;

the paper, cut to the size of the glass, must then be placed in a bath of filtered water for a few minutes, and then laid on the surface of the water which covers the collodion. The glass must then be slightly inclined until paper and glass are brought into contact, when they immediately adhere to one another and the collodion picture is transferred from the glass to the paper.

Q. How is the paper separated from the glass?

A. As soon as both are dry, the corner of the paper should be raised with a penknife to ascertain if the transference have been successful; if so, the paper may be carefully removed, and will bear away with it the collodion image; if the process has been unsuccessful, the paper and glass should both be placed in the bath again as before.

(To be continued.)

Correspondence.

PORTABLE DARK TENT.

Sir,—Enclosed, I have ventured to send you two photographs of a dark tent which I have constructed, and which I think has some advantages over those in general use: to us of the camera who prefer *seeing* what we are about, a simple and portable tent, capable of manipulating large as well as small plates with perfect facility, would be acceptable in more points than one. The cost would not exceed one fourth of what is usually charged for one of the same capabilities.

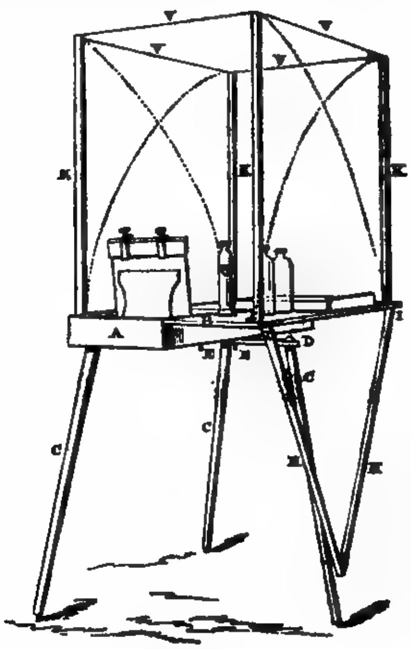


Fig. 1.

The box A, which forms the table, is made of light deal wood, ½ an inch thick (or less), dove-tailed together at the angles, and is 3 feet long, 13 inches wide, and 3½ inches deep, inside measurement. The lid B should be "clamped" with cross pieces grooved into the ends to prevent warping, and be hinged so as to open level with the top of the box. The legs C C C are of beech, tapered towards the bottom, and having a screw turned on the top (which any turner can do); two of them screw into blocks (also of beech) about 1 inch thick, glued inside in the front corners of the box, the third into the projecting piece D, at the back, which is fastened at the edge and middle of the box with wooden thumb-screws E E, either screw being removable, so as to allow it to perform a quarter of a circle, and lie along the box when travelling. The back leg is provided with a small staple at F, to admit the point of a wire driven into the bottom of one of the pieces H H, which fold together at F with a hinge (*see Fig.* 2), and when open support the lid

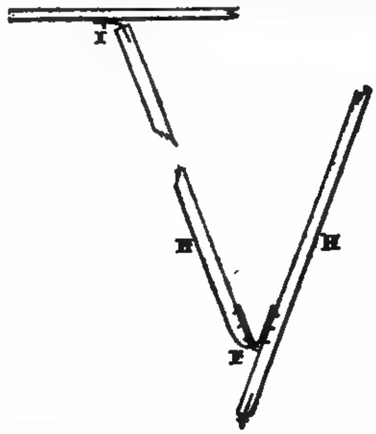


Fig. 2.

(*see Fig.* 2). Four pieces of deal K K K (about 1 inch wide and ½ an inch thick) are hinged to the upper corners of the box, as shown in the engraving, so as to pass each other in the direction of the dotted lines on disengaging the wires L L at one end only, the other end being looped over small wire staples in the upper part of the uprights, so that they fall down and fold, one with each of the uprights. It now remains to fit the covering, which consists of one thickness of black glazed calico, and one thickness of yellow calico (the

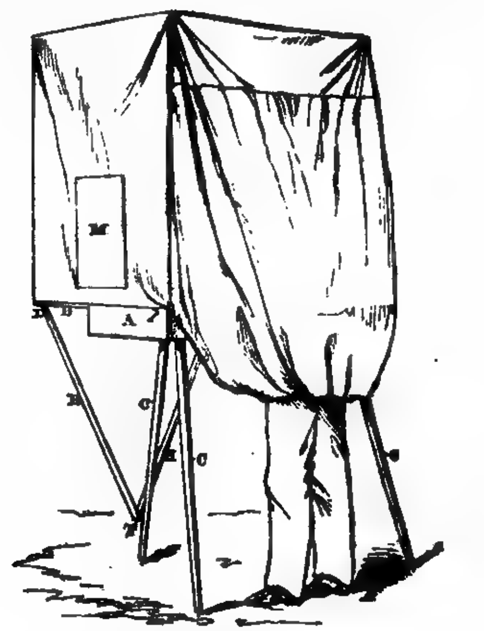


Fig. 3.

former being outside, of course); it is made to fit exactly over the top, back, and ends of the upper framework. The front piece is shaped like the section of a truncated cone, the width of the top being the length of the box, and the bottom descending about 18 inches below the box, and extending the same beyond each side; this piece is sewn into the front and forms a sort of hood. The open space below the box *inside* the hood is supplied with a piece of the stuff used, nailed along the inside of the box just below the edge. The

whole is now to be nailed round the other three sides of the box and lid on the inside with small tacks; and on folding down the uprights, the tent can be neatly doubled up to allow the box to be closed, the legs can now be unscrewed and laid inside, and the lid fastened by means of a strap or other contrivance. I forgot to mention, that the window M is made by cutting out a square of the black stuff, and inserting two thicknesses more of the yellow linen.

JOHN C. TWYMAN.

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PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

SIR,—I believe my last communication concluded by stating that I had taken a photograph of a turreted gateway of a building formerly inhabited by Edward III. and his wife. The next I took was the north side of the Kauter, a square planted with trees and surrounded by some large buildings; this gave me three or four good pictures; and another was furnished by the *Maison des Bateliers*, where the guild of watermen formerly held their meetings. It stands in the Quai aux Herbes.

The belfry, which is 280 feet high, makes a good picture; it was once used as a watch tower, and the tocsin bell was hung in it, the sounding of which summoned the citizens from their houses in cases of alarm. On the top of the spire there is a gilt dragon which was taken from the top of the spire of one of the Greek churches in Constantinople, during the Crusades. I was obliged to take it in two portions, but by approximating the edges of the negatives as closely as possible, with a very thin film of gelatine between them, I am able to print positives which scarcely allow the break to be discerned unless carefully looked for.

The Hotel de Ville gives a very good picture, and so also does the University, which is a modern building, with a fine portico; a copy from that of the Pantheon at Rome.

The Cathedral of St. Bavon offers much greater inducements to photographers to operate inside than outside the building. I do not regret the trouble I took to obtain a picture of its external aspect; but if, as is possible, I pay another visit to Belgium in the ensuing summer, I shall endeavour to make arrangements for taking a series of views of the interior and its contents. There are numerous chapels in it which would give a beautiful series of stereoscopic negatives, and a fine picture might be made of the high altar, on which stands a statue of St. Bavon, and in front of which are four high copper candlesticks, which were once the property of Charles I. of England. They bear the English arms; and it is supposed that they were formerly in St. Paul's or Whitehall chapel, and, after that monarch was beheaded, were sold and sent to Belgium, though it is not improbable that they may have been taken there by some of the royalists who fled from England to Belgium at that time.

Like Bruges, the objects of interest in Ghent are by no means confined to those I have mentioned. There is scarcely a street which does not contain several houses of a quaint style of architecture, and the wooden fronts of some of them are most elaborately carved. Some of the prettiest pictures I have I took in the early morning, in the streets of the city, which, though far from being so crowded as they once were, are by no means so deserted as those of Bruges. Your readers are no doubt familiar with the history of Ghent, and if they are not they will hear it all, and more, when they visit that town, from the idle vagabonds who infest the railway station, and hang on to you, like a limpet to a rock, the moment you set foot in the streets. It is in vain that you say you do not require their services; they stick to you wherever you go, and often have the impudence to follow you into a shop if you enter it to purchase anything, doubtless with the intention of levying black mail on the shopkeeper afterwards, on the pretence that they have brought him a customer. I have got out of a train early in the morning, and left my luggage at the station while I went to look through the town, to see if there were any buildings in it worth stopping to take; I have been set upon by one of these fellows the instant I left the station, and he has stuck to me throughout the entire day. I went into a barber's shop to perform my ablutions, and the fellow followed me in and entered into friendly conversation with the scraper of chins; when I left, he followed me. Threats of the police were of no avail, and this I was not surprised at, for if it is difficult to find a policeman in London when you want one, it seemed to me almost an impossibility to find one under similar circumstances in Belgium. I went into an hotel to dine, and when, after I had been engaged an hour in this interesting occupation, I looked out of the window, the first object that met my eye was my vampire, seated on a stone opposite, and patiently smoking a short pipe. I thought I would get rid of him by going out by another door than that by which I had entered, and had got almost to the end of the street and was congratulating myself on being at last free, when a gruff voice close to my ear said—"Zir, 'das vas der house ver der Spanish killed sexteen mens, and——." I interrupted him to point out the uselessness of wasting his time upon me, and suggested that a good many English were coming from Ostend, and that he might lose an opportunity of benefiting himself by keeping near me. All was in vain; I might as well have spoken to a statue. If I stopped to look at a house, he immediately began a tale which, I firmly believe, was, in most cases, invented on the spot. If I went into a church, of course he followed me in there, not, as may be supposed, with the intention of saying his prayers, but with the double object of keeping me in sight and making a little property out of me; which he did, in this way:—In most of the churches in Belgium, that contain paintings of any note, these paintings are covered with a screen of green baize; and to see them it is necessary to find the official charged with the duty of showing them, and, as a matter of course, paying him a fee for his trouble. Without waiting for the verger, or whatever he was, to come to me, my persecutor started off in search of him, and after the exhibition was over I observed a transfer of sundry copper coins from the hand of the verger to that of the extortioner. In this way he followed me from nine o'clock in the morning until five in the afternoon, and at the end of that time had the impudence to demand five francs for his attendance on me. As I have already said, one or two of these vagabonds may be made available to carry your apparatus, and if your time is limited he may be really useful in taking you to places of interest, with the least loss of time. I have generally had plenty of time at my disposal, and have therefore adopted a different plan, in some cases. I walked about the town with a local guide book for a day, or two, or three, according to its size, making a note in my memorandum book of the views I proposed taking, and then hired a cab, into which I placed my apparatus, and drove, at the earliest possible moment in the morning, to the different places I had marked out in succession. In this way I did not lose a moment, and was generally able to take all I wanted, both in the town and suburbs, in one day.

VIATOR.

Photographic Societies.

THE FRENCH PHOTOGRAPHIC SOCIETY.

AT the last meeting of the French Photographic Society, M. Regnault, in the chair, after the routine business had been disposed of, M. C. Silvy presented to the society studies of animals from nature; Baron Marguerit, a series of pictures of different parts of France; M. Jamin, some copies of engravings of large dimensions taken with a French orthoscopic object-glass constructed in his factory; M. Delahaye presented to the society in the name of MM. Leon and Masson a plated copper bas-relief, representing allegorical figures supporting the medallion of MM. Daguerre and Nièpce.

M. Opsor then addressed the meeting on the subject of a dry collodion process employed by him, the mode of developing being new. His description was not considered sufficiently explicit, and he was requested to furnish more minute details. He also gave the society a description of an improvement he had introduced in the manufacture of negative frames, and of boxes intended for carrying sensitised glasses. His plan is said to completely secure the interior of the frame from the introduction of light, and is equally applicable to all the apparatus from which it is desired to exclude light.

M. Asser, of Amsterdam, forwarded to the society some photographic proofs which were obtained by a process discovered by him, based on the use of printer's ink. He wished to be excused from giving the details of his process just yet, but he wished the society to test their permanency in any way they pleased.

M. de Brebisson's paper on the subject of pictures obtained by a carbon process was next read. The author presented some proofs.

In reply to an observation made by MM. Salmon and Garnier on the analogy of their method with that pursued by M. de Brebisson, M. Girard pointed out that the gentleman in question did not claim the credit of the discovery.

M. Delahaye dwelt on an interesting peculiarity, mentioned by M. de Brebisson, to the effect, that one finds less sensitiveness in bichromate of potassa that has been exposed to the light for a considerable time in the form of crystals, than in the freshly prepared bichromate.

A note from Mr. Maxwell Lyte was next read, on the subject of a new gold toning process.

Dr. Valtier presented sundry positive proofs, some of which were silver, and others by a process based on the use of a substance known as *oxyethylate*, the price of which is less than nitrate of silver. He was ignorant of the nature of this substance, as well as of the name of its inventor. The examination of the prints was deferred until the substance in question had been duly presented.

M. Girard protested against the use of such a barbarous term as that of *oxyethylate*.

The following letter from M. Quinet was next read:—"At the last meeting of the French Photographic Society, M. Ferrier presented, in the name of M. Hermagis, a new memoir on the stereoscope with parallel spheres. . . . . I see that the improvement introduced by M. Hermagis in the stereoscope, consists in the use of lenses with parallel spheres, placed parallelly towards the proofs contained in eyeshades five centimètres high, allowing the eyes to be placed in the axes of the luminous cones. Also, that the merit of this improvement has been disputed with him by M. Claudet, who says besides, that for the coincidence of the images to take place the lenses must be a little inclined. Judging from this, and from my knowledge of the effects produced by the optical part of the stereoscope, I believe I may say that they are both beside the truth. If M. Claudet inclines his lenses, it is to force the visual ray to pass through the edge of the glass, and consequently through the prismatic part of the lens. It is the same with M. Hermagis, who is obliged, in order to avoid the error with which he reproaches M. Claudet, to have eyeshades five centimètres in height. Here again it is through the prismatic part of the lens that the images are seen. . . . . I have here one of M. Hermagis's stereoscopes, half the object glasses of which I have masked; and if the phenomenon described by him exists, the relief could not be seen, for the eye is prevented from looking directly and parallelly at the image. The middle of the object glasses being masked forces the two visual points to converge towards the centre of the apparatus, to afterwards join, by diverging, the two images, after having traversed the two prismatic parts of the lens.

M. Moigno remarked that M. Hermagis's note in no way agreed with the theory of the stereoscope. The note stated that he had obtained the appearance of stereoscopic relief with two identical pictures, which was impossible, and he must have confounded stereoscopic relief with the much less considerable relief of monocular vision. Every one is aware that, when a photograph is looked at with a single eye, a certain relief is visible, which disappears as soon as the proof is looked at with both eyes. This was the reason why M. Hermagis was obliged to use high eyeshades to increase the distance between the eyes and the pictures, and thus obtain a relief for each of them due to monocular vision.

The President admitted the soundness of M. Moigno's conclusions; he thought, however, that, besides the geometrical theory of the stereoscope, it might be possible to obtain effects analogous to stereoscopic effects by operating in a different manner, and it would be interesting to see stereoscopic effects produced by identical images placed on the two sides in such a way as to satisfy geometrical rules. He considered M. Hermagis's reasonings to be not absolutely correct according to the principles of physics, but his experiments were not the less worthy of mention.

M. Humbert de Molard presented an apparatus constructed by M. Relandin with the object of preserving nitrated papers for a lengthened period. This apparatus contains no preparation, and consists simply of two rollers, around which a piece of linen is wound, and in which the papers are enveloped.

M. Pesme presented, and worked, a machine for cleaning glass plates, constructed by M. Richardin. It is capable of cleaning as many as 500 plates a day.

M. Gérard presented a stereoscope which differed from the ordinary ones, in being capable of receiving glasses of different colours behind the glass slide, which, by means of a double frame, could be raised and lowered so as to give any tint to the picture which might be desired.—*Condensed from the Bulletin of the French Photographic Society.*

Miscellaneous.

CAUTION ON THE EMPLOYMENT OF TRANSPARENT POSITIVES IN THE MAGIC LANTERN.—Some four years ago we were staying at a friend's house in the country for the purpose of spending a part of the Christmas vacation. Among other things introduced for the amusement of the children, was of course a series of dissolving views. At the conclusion of these there was a slight pause, and then there suddenly appeared on the screen the figure of a young man, with a most ghastly expression of countenance, evidently a victim of consumption. The expression was so truthful and vivid, that we saw at once it must have been produced by the insertion of a transparent positive in a camera through which light was transmitted. There was scarcely time for us to remark to my neighbour on the exceeding bad taste of the person who had done this, when we were startled by a succession of dreadful screams which rose in the darkness. A light was brought, and it was found that a young lady was in strong convulsions, which were followed by an illness from which she did not recover for many weeks. It appeared that the person represented on the screen had been known by her, as well as by many others of the company, in his lifetime; and from the impression made on her, it seems probable that she must have been more attached to him than any one besides herself was aware. It is such a source of amusement to most people to see portraits of themselves and friends reproduced in this way, that we have recommended it as a source of amusement for winter evenings; but, at the same time, we would strongly advise young photographers who may adopt it to confine their efforts to the representation of living individuals.

FACSIMILE "HAMLET."—A curious and interesting application of photography has been recently made, to the reproduction in facsimile of the margin copy of the first edition of Shakspeare's "Hamlet." This facsimile was liberally ordered, at the expense of the late Duke of Devonshire, for multiplication of the copy to the extent of forty examples, with a view to their circulation among the great libraries of the country, and those of a few favoured private individuals. The text was transferred by photography to stone, and Mr. Netherclift undertook to translate it from the stone to paper. As a facsimile each copy is perfect.—*Art Journal.*

PHOTOGRAPHIC IDENTIFICATION OF A MURDERER.—On the 11th Nov., 1854, at Retiers, a man named Lefeuvre, a carpenter, shot and killed a woman whom he suspected of poisoning his dog. He immediately afterwards fled, and was condemned to death, *par contumace*, on the 22nd May, 1855. A few days since, a man was arrested as a vagrant at Rodez, and as he refused to give his name, the aid of photography was called in, and a number of portraits of him were sent to different police stations. One of them happened to reach Retiers, and was soon recognised as the portrait of the murderer who had so long evaded justice.

Photographic Notes and Queries.

COLOURING GLASS POSITIVES FOR THE MAGIC LANTERN.

SIR,—A correspondent, William Cochran, of Glasgow, in last week's "NEWS," asks for a receipt to colour glass positives for the magic lantern.

To accomplish this properly, so as to preserve all the delicacy, sharpness, and detail of the positive, is a valuable secret, the knowledge of which I am very happy to be able to impart to him.

1. Place the glass to be coloured before a candle or window.

2. Mix a few drops of spirits of ammonia with transparent oil varnish, and with the following transparent colours, using a fine soft sable brush :—

For Black —Use ivory black.
White —Leave the glass uncoloured.
Brown—Use burnt sienna ; or, mix lake, gamboge, and Prussian blue.
Orange „ lake and gamboge.
Purple „ lake and Prussian blue.
Red „ rose carmine or lake.
Green „ Prussian blue and gamboge.
Blue „ Prussian blue.
Yellow „ gamboge.

3. Remember to procure powdered transparent colours and oil varnish from a good colour maker or a varnish manufacturer, explaining, at the same time, the purpose you require them for. The colours and varnish are to be well rubbed down on a marble slab.

4. Fill up the background with ivory black, and use the varnish to moisten it with.

5. Do not varnish the glass to be coloured first.

6. Use varnish in quantity according to the depth of colour required, and for that purpose only.

7. Try *dabs*, with a brush, on a piece of glass, to test the depth, transparency, and quality of the colours, before commencing.

8. If too opaque, add more varnish and spirits of ammonia—two drops to about a teaspoonful of the varnish. I can produce a clear reflection on any white screen equal to the finest stained ruby or cobalt glass.

If any further difficulties arise, which I respectfully submit will not be the case if proper attention is paid to the rules before laid down, yourself, or any other person, may reckon on my endeavours to clear them away.

HARRY BELLINI.

[We shall feel greatly obliged if our correspondent will forward some further particulars on the other subject mentioned in his letter. It would be also very important if we could be favoured with a specimen of the results, or an address, where we could communicate with him on the subject.—ED.]

TONING PAPER POSITIVES WITH BICHLORIDE OF PLATINUM.

DEAR SIR,—Some three or four years ago I tried the bichloride of platinum for colouring pictures in the place of gold, and I thought that the balance of advantages was in favour of the latter. I have preserved no specimens, and can only speak from a general recollection that, besides working slower, a larger quantity was required to produce the same effect—thus nearly equalising the cost. On the whole, I did not find any sufficient advantage to induce me to continue its use.

The best practical method of colouring albumenised prints then known, was by adding the gold or platinum to the hypo. bath, and this was the only form in which I tried it. Perhaps, in the better colouring baths since introduced, its effect might be somewhat different. The resulting colour was much the same as that produced by gold; and, as the permanence is probably equal, the only question was one of economy.

I also tried, at the same time, and in the same manner, the perchloride of iron. This also produced a good colour (probably due chiefly to sulphur); for this reason I never used it in practice. One would think, that not a few of the pictures now sold—particularly stereoscopic—must be coloured in some such way, otherwise I really cannot understand how it is that so many of them fade with such rapidity. I have, myself, in time past, employed very bad processes, such as I should not now think of using; and although the lights of some of my older pictures have turned very yellow, scarcely one of them, so far as I am aware, has faded, in the proper sense of the term. I have always been particularly careful about the washing, and perhaps it is to this that my good fortune is owing. Nothing can be more slovenly than the way in which I have seen it done, and that too by operators who ought to have known better. It is unfortunate for honest printers that, in general, the appearance of a photograph affords no clue to the process by which it was taken and coloured, nor to the sufficiency of the washing.

I have no doubt that an ordinary positive print, toned with gold by any of the recent processes, and carefully washed, may be considered quite permanent. I do not despair, however, of some cheaper and quicker way being discovered. The ink process is a step in the right direction; but any one who will look over a bundle of old letters, will see great reason to doubt whether a picture in gallate of iron is more permanent than an ordinary silver print.

W. R. SEDGFIELD.

GLASS DISHES.

SIR,—A few weeks since you did me the favour to insert a letter on "Photographic Desiderata," which appears to have induced several gentlemen to communicate to your columns various modes of making and cementing glass dishes. Admitting these built dishes, as they are technically called, remain perfectly sound and water-tight for many months or years, they all still possess the following serious defects, viz., that the line of junction of the sides and bottom, *almost* microscopic though it be, is *rough;* and, as long as the dish is only used for silver solutions, no harm ensues; but if used alternately for exciting and developing waxed paper, for instance, decomposition and turbidity of the respective solutions speedily inform the manipulator that his dish was not chemically clean before using. The manner in which the sides of most built dishes are attached or cemented to the bottom, is most objectionable, viz., at an acute, or right angle, the dirt which lodges at the apex of the angle, represented by the *rough line* of cement, being removed with great difficulty, and a small quantity of old gallo-nitrate too frequently remains. If good moulded glass dishes could be procured, whose sides sprang from the bottom in a curve, and possessing no corners or angularities; and if measures and developing glasses had the "punty marks" properly ground off and polished, the "washing-up days" of photographers would be bagatelles, and not the fatigues and bores they are at present.

GEORGE EDDOWES.

THE COLLODIO-ALBUMEN PROCESS.

DEAR SIR,—In reply to your correspondent, "An Amateur," the *collodion* should be iodised and sensitised in the collodio-albumen process, otherwise it is very much slower in the camera, and also in development; many persons have tried all possible variations in order to simplify this process, but I think in all instances the results have been inferior. The modification your correspondent mentions, of washing off the albumen, has been tried here some time ago; the objection to it is, that in large plates it is impossible to wash off the albumen evenly; the same result can be obtained by

reducing the prepared albumen with water, and so leaving a smaller amount of albumen on the plate, but I think in general the old proportion of albumen to water gives more satisfactory negatives. J. SIDEBOTHAM.

Manchester.

ANSWERS TO MINOR QUERIES.

PREPARATION OF IODIDE OF AMMONIUM.—*Clark.* Many methods have been from time to time recommended for the preparation of this salt, but the best in our opinion is the following:—prepare iodide of iron first by heating together 5 parts of iodine and 25 parts of water, into which are gradually added 2·5 parts of iron filings; when the iodine has all disappeared, filter and add carbonate of ammonia until a precipitate no longer falls; then pour the whole into a filter and wash once or twice; collect all the clear filtrates together into a dish, and evaporate by a gentle heat till the salt crystallises out. It must be kept in a well stoppered bottle in perfect darkness.

COTTON-WOOL BRUSH FOR THE CALOTYPE PROCESS.—*Paper.* We believe these brushes were first suggested by Mr. Buckle, at all events they bear his name, being known familiarly as Buckle's brushes. They are made by taking a glass tube, from two to six inches long and half an inch in diameter, and forcing a tuft of perfectly clean cotton wool into the end, so that sufficient remains projecting to be used as a brush. The tuft should fit sufficiently tight in the tube for there to be no danger of its coming out in use. We have found a good plan to avoid the possibility of this happening is, to tie a piece of silk thread round the middle of the cotton-wool, and with that *draw* the tuft into the end of the tube.

GLAZE FOR COLOURED STEREOGRAMS.—*A Subscriber.* The plan adopted by several of the most popular artists is, to have the slides rolled between steel cylinders after they are coloured. This gives them a gloss without in the least injuring the colours.

SUBSTITUTE FOR GROUND GLASS.—*S. S. B.* A correspondent has informed us that the most simple substitute for ground glass is thin starch paste poured over plain glass, and then allowed to drain and dry spontaneously.

PREPARATION OF PROTO-NITRATE OF IRON.—*Positive Photogram.*—Dilute 9 parts of strong nitric acid with 90 parts of water, and when cold, add to this, in a flask, 8 parts of pure iron wire. Place in cold water, and allow it to stand all night, agitating now and then. When required for use, add one-third of a drachm of glacial acetic acid to every ounce of solution. This will keep for many months in a well-stoppered bottle, and will be found an excellent developer for positives. Another very good formula is the following:—Dissolve 1,600 grains of nitrate of baryta in 45 ounces of cold water, and 2,000 grains of crystallised sulphate of iron in 15 ounces of cold water. Mix three parts of the former solution with one part of the latter, filter or decant from the sulphate of baryta, and add half a drachm of glacial acetic acid to every ounce of the solution.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

We must beg our correspondents not to send glass plates through the post, except they are securely protected against breakage.

HARRY BELLINI.—Will our correspondent oblige us with an address where we could communicate with him. We shall be very happy to receive the particulars and papers referred to.

F. H., Newcastle-on-Tyne.—We are engaged in organising a plan, by which what you propose can be very satisfactorily accomplished. In the meantime, we would suggest the advisability of your inserting a short advertisement in our pages.

A HARD WORKING AND PRACTICAL AMATEUR.—Received with thanks.

S. S. B.—The best plan for you to adopt to obtain nitrate of silver from the powder and solution which you have at present, will be to add excess of carbonate of soda, evaporate to dryness, and mix with four times its weight of dry carbonate of soda. Then fuse in a crucible as recommended in our last number, and you will obtain a button of metallic silver. Your suggestion is a very good one, and we will at once proceed to carry it out; we hope to be able to commence in our next number.

G. L. G.—If you will forward to us a specimen of the crystal you obtained, we shall be able to tell you what it is. We should also like to see the kind of effect you say it produces on glass positives.

R. W.—1. Yes. 2 and 3. We regret we cannot answer

LATENT.—1. Collodion of a dark colour is generally less sensitive than when it is paler. The colour is due to iodine; which can be removed by adding a few grains of metallic cadmium. 2. What developing solution do you refer to? 3. If kept in a *well* corked or stoppered bottle, spirits of wine will retain its strength for any length of time. 4. Amber varnish will do for both positives and negatives. 5. There must have been some impurity in the gutta percha vessel in which you placed your bath; probably hyposulphite of soda, or developing solution. 6. Soak it for some hours in a strong solution of cyanide of potassium, and then rinse in dilute nitric acid. 7. Your ground-glass is too coarse. Procure some prepared especially for focussing, under the name of grey glass.

K. X.—1. Of course the upper tub must be pushed sideways; so as to allow the tap to be over the lower one. 2. Yes. 3. At any chemist's.

T. W. HOWARD.—We have a letter for this gentleman; where shall it be sent?

F. W. T.—We cannot give you a fuller account of the formulæ, &c., required in the negative collodion process, than will be found in our "Catechism." We are much obliged for the information contained in your letter.

A. U. T.—Use a 100-grain solution of nitrate of silver for exciting the paper by; and keep longer in the gold bath.

J. GREENHALGH.—The cotton you enclosed is the right kind to be used in making pyroxyline.

W. H. W.—Your letter has been forwarded to Mr. Woodward.

J. M.—We have forwarded to your address a note; which will give you the desired information.

R. M. S.—1 and 2. We can only answer by referring you to our back numbers. 3. The formula you ask about is given at p. 12. 4. We cannot at present answer. 5. The diameters are somewhere *about* 1⅝, 2¼, and 3¼-inches; but they vary with different makers.

PHOTOGRAM.—We will inquire; and answer our correspondent in our next number.

THETA.—It requires a bright summer's sun to carry out the experiments which we contemplate performing with the new metal Junonium. We do not know where the error lies in your toning process. Will not the gold solution darken it if kept in longer? The *quasi* Editorial article addressed to that unfortunate young photographer is all nonsense. Acetic acid in the bath *is* a great improvement; and helps very materially to keep the whites clean. You cannot do better than persevere in the formula given at p. 84.

W. R. R.—We do not think you will meet with as much success with the "paper-glass" as with gelatine paper. We will give the other information required shortly.

ANNIE.—Fine thin paper, such as is prepared for photographic purposes, will answer best. Black japan can be obtained of a varnish maker or coach builder. We are happy to think we have earned such golden opinions from you.

PHARO.—We are not aware that reticulation of the film is owing to the silver bath not being strong enough. Water in the collodion is the most usual cause.

A SUFFERER.—The poisonous properties of commercial cyanide of potassium are not by any means dangerous if ordinary care be taken.

C. C.—A good landscape lens will not cause buildings to appear to fall forwards if you take care to keep the camera perfectly horizontal. If you send an address, we will communicate with you on the other matters.

F. C. D.—1. *Plain* paper only should be floated on the albumen solution. 2. About half an hour. 3. The pictures you allude to were taken by employing a perfectly black background behind the sitter, and then backing up with chocolate-coloured paper.

BROMMELL.—1. Good portraits cannot be taken in a room lighted with only one window in the way you name. A sky-light will be a better addition than another window. 2. The time of exposure will depend so much upon the quality of the lens and collodion, that nothing but experience will enable you to judge; you can, however, try five minutes to commence with.

UN ELEVE.—A little more or less than the specified quantity of protosulphate of iron in the developing solution will not be of any material consequence in the result. Nitrate of iron is used by some photographers; we have given the method of preparing it. Glacial acetic acid is to restrain the too energetic action of the developer. More is required in summer than in winter. Your other queries we cannot at present answer.

R. WILSON.—A wooden frame can easily be contrived, against which prepared plates can rest against the wall to dry. When dry, they should be stored away in tin boxes. We hope to be able to give information on the other point by our next number.

CHESHIRE JOHN.—You had better procure a half-plate portrait lens, and a single stereoscopic lens.

T. BOLLINS.—We hope to be able to give you the desired information in our next number.

J. A.—1. Except in very open and well ventilated places, all stoves in which gas is used for heating purposes should be supplied with a flue to carry away the noxious products of combustion. 2. The collodio-albumen process, in our opinion, is superior to Fothergill's.

G. S.—The prints look as if the sensitive paper had been kept too long before being used. They have not remained long enough in the gold bath.

R. T. B.—1. Protosulphate of iron. 2. Not so good as some we have published. 3. Soak it for some days in strong solution of cyanide of potassium; and then, after rinsing, for a few hours in dilute nitric acid. 4, 5, 6. Very little is known about the peculiar properties and requirements of acid or alkaline collodions; we are, however, inclined to answer these questions in the affirmative. 7. Consult previous numbers. 8. Wash it well with dilute sulphuric acid, and then with pure water, and the silver will be pure enough.

A. NOVICE.—1. In an early number. 2. In front of the lens.

AGATE.—Well washed in cold water.

Communications declined with thanks:—F. R. S.—A Dabbler.—James F.—Thomas.—N. O. B.—Stereogram.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—January.—W. A. L.—G. M.—Letter Box.—J. S.—Taper.—Are Longa.—Aplanatic.—A Subscriber from the First.—Blotting Paper.—W. W. W.—S. E. A.—Q.

IN TYPE:—H. F.—H. D.—H. C.—A. D.—X.—M. D.—A. B.—M. C.—A London Firm.—W.—An Amateur—S. T.—T. H. C.—H. D.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

_ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. I., No. 25.—*February* 25, 1859.

PAPER *versus* COLLODION.

BY M. VERNIER, JUN.

Since the discovery of collodion, the paper processes have almost gone out of practice, and that for good reasons. Collodion acts more quickly, and gives clearer pictures: nevertheless, if two positive proofs be taken of the same landscape, the one obtained by means of collodion, the other on negative paper, it will be remarked that the one taken on paper is richer, softer, more aërial, and deeper, in short, more artistic than the other. This difference of results induced me to make fresh trials with paper, with the object of obtaining the sharpness and rapidity of collodion.

The method I am about to submit to the consideration of your readers will, I hope, have the result of restoring the negative paper to the position it originally held among photographic processes. As the basis of my experiments, I selected gelatine as used by one of the ablest of photographers, M. Baldus; this substance does not alter the silver bath, but allows it to retain all its limpidity. Following his method, I obtained more sharpness by sizing the paper before iodising, and greater rapidity by immersing it in an ethereo-alcoholic iodide bath before submitting it to the silver bath; beside these two operations, which are over and above M. Baldus's process, I develop the picture with sulphate of iron, which, as is generally known, is the quickest developer. The method I employ may be briefly described as follows:—

I choose a paper, the substance of which is very equal, and mark one of its sides with a pencil; I then float it for a minute or two on the following substance—rain water, 1000 parts, gelatine, 15 parts; after which, I take it out, and dry it by suspension. I prepare a considerable number of sheets in this way; and when they are dry, I collect them, and put them in a blotting book, which I then put under the press until the following day.

Iodising.—If the gelatinous substance, which served for the sizing of the papers, is still sufficiently attenuated, I add to every hundred parts of liquid—iodide of potassium, 3 parts, bromide of potassium, 0·6 parts; I dissolve with the aid of heat, and strain the whole through a cloth, and then pour it into a dish, which is kept warm by being placed over a stove. I then treat my papers with this solution in the same manner as on the preceding evening, taking care that no bubbles of air form beneath them, and I also place them on the solution with the marked side downwards; after drying, put them away in a box in a dry place. This double preparation gives great clearness and delicacy to the proofs; renders the paper unalterable; preserves its whiteness; and prevents it from ever becoming spotted—the reason of which is easily understood, the iodine not being in contact with the body of the paper, which often contains various kinds of substances capable of neutralising it in places, and producing, after the development of the picture, a greater or less number of little spots, which disfigure the picture in an irreparable manner. The preliminary sizing is therefore of incontestable utility.

Sensitising and *exposure.*—To use this paper, I take it by an angle, by means of a small iron hook coated with gum-lac dissolved in alcohol, and immerse it in a bath, composed as follows:—Ether, 25 part; ordinary rectified alcohol, 75 parts; iodide of potassium, 0.5 parts; the paper imbibes it instantaneously. If I want it for dry purposes, I remove it, and suspend it until dry; in the contrary case, I lay it at once, face downwards, on the silver bath used for collodion negatives; after a contact of two or three minutes, according to the temperature, I remove it, and place it immediately in the negative frame for exposure. The time of exposure is very nearly the same as for collodion; nevertheless, I must observe, that a silver bath, strengthened with acetic acid, renders the paper *more* sensitive. In all other processes this acid retards the luminous impression, while the very contrary results in this case; the acid opens the pores of the gelatine, swells it, and, consequently, renders it more permeable to the chemical action of the light.

Development of the picture.—When the exposure has been sufficiently long, I plunge the paper in water mixed with alcohol; I then extend it on the solution of sulphate of iron, as used for developing collodion. The image speedily appears in all its details; if it is wanting in vigour from insufficient exposure, I allow the paper to drip; spread it on a glass plate, and pour on it, commencing at one of the angles, a weak solution of nitrate of silver, and then pass it a second time on the sulphate of iron. This simple method of strengthening it, suffices to give the negative all the intensity desired.

It will be seen that, when one has a plentiful supply of iodised papers, the manipulations are very simple, requiring but little time, and no complication of new baths; but the especial advantage that this bath presents is, the facility with which one obtains very good proofs by the dry method. To return to what I said above relative to the paper, which I dried by suspension on taking it from the ethereo-alcoholic iodide bath. This desiccation of the paper is not absolutely essential for the dry process. I point it out, because I find it gives greater facility in working. I generally prepare eight or ten sheets; when I am doing the last, the first, well drained, is ready for placing on the silver bath. After the two washings, which must follow the sensitising of the papers, the other operations are the same as in the wet process.

I one day exposed two papers in succession, on each of which I took the same picture, one I treated with sulphate of iron, the other with gallic acid; the former developed rapidly, and gave me, as usual, a good negative; the latter, submitted to the reducing bath of gallic acid, after half an hour's immersion gave no sign of a picture. Being convinced that the paper had been acted upon, the exposure having been the same as in the other case, I strengthened the bath with some drops of nitrate of silver, and waited an hour to see the result, but still no picture. Finally, vexed at finding it would not come out, I took a bottle containing an old nitrate of silver bath, which I had used formerly in different experiments; it contained ether, alcohol, iodides, acids, and a little sulphate of iron. I decanted the clear part of the liquid, and poured a considerable quantity of it in the gallic acid solution. I then went on with some other work, and left the proof to itself. An hour afterwards, on going into my laboratory, I was greatly surprised to see the picture perfectly developed; but what astonished me most was the fact, that the reducing bath had undergone no alteration. What was the substance in the old bath which preserved the gallic acid in good condition?

There is another question to which I will attempt to give an answer:—Why is collodion more rapid than all other films used in photography? Does this rapidity arise from the pyroxyline employed in its composition, or is it due simply to the two substances in which it is dissolved?

Without pretending to give a positive opinion on this sub-

ject, I believe it must be attributed to the ether and the alcohol combined. In fact, I have just shown that these liquids, by imbuing the paper instantaneously, facilitate the combination of photogenic products, and, consequently, open a more free access to the chemical action of the light.

THE MOLECULAR ACTION OF CRYSTALLINE PARTICLES.*

BY DR. A. WELLER.

The fixation of the mercurial vapours in the daguerreotype process which has excited so much interest, and for which so many theories have been advanced, is but another example of the force which causes the deposition of solid and gaseous particles from a liquid, and which produces so many other effects. In this case the chemical rays of light act in the same manner as mechanical action and caloric in causing a certain molecular disturbance. By the discoveries of Möser it is shown that these rays possess the power of acting upon almost any body, in such a manner as to render it capable of fixing the particles of various vapours. Thus simple minerals, glass, &c., may be made to fix the mercurial vapour. It appears, however, that silver, gold, copper, &c., which form amalgams, or, in other words, are capable of being wetted by mercury, possess this property in a greater degree than any other bodies which are capable of being wetted by it, in the same way as we have seen that glass has the greatest power to fix the vapour of water. Admitting the truth of this theory of the daguerreotype process, we are naturally led to inquire whether the same agent may not likewise cause the fixation of particles in a state of solution or of vapour, in the same manner as by simple mechanical action. After several unsatisfactory attempts I finally succeeded in clearly proving this fact. The solution which shows the influence of light the most evidently is that of the neutral chloride of gold. A few grains of this salt dissolved in an ounce of water, when exposed to the light, deposit minute crystals of a metallic appearance on that side of the glass nearest the light. The action of light in causing the deposition of gaseous vapours may be shown by placing some iodine in a bottle closed with a glass stopper. After being exposed in the sunshine for several hours minute black crystals will appear on the side nearest the light, which will change their position according to the side of the glass exposed. Another substance which shows the action still better is camphor; a piece of which, merely covered with a glass shade, will give rise to a crystalline deposit after an hour or two of exposure to light, which presents the same phenomena as those of iodine. By a prolonged exposure these crystals become very abundant, and very beautiful. I have applied this property to the construction of an instrument for measuring the chemical rays of light. As the details would be foreign to our present subject, I will defer them to another occasion, and confine myself now to prove that these phenomena are independent of the deposits caused by radiation.

1st. The crystals are formed on the side exposed to the action of direct or diffused light.

2nd. They are not formed during the night, when the radiation of the earth is sufficient to cause the deposition of water.

3rd. Green glass, which retards photographic action, likewise impedes this deposit.

In an experiment which is now going on, a bottle of pale green common glass is exposed to the north, while another of white glass is placed in a southern aspect. The first became covered with minute crystals, in size averaging about a millimètre, which have remained stationary about a week; the second is covered with arborescent ramifications, which are daily increasing. Several familiar, but hitherto unexplained phenomena, may, in my opinion, be easily accounted for by these molecular actions. The formation of hail I consider to be an instance of an action precisely similar to that which causes the deposition of the solids of gaseous and liquid particles. If we admit the influence of this force on the globular vapours of water, it is not at all improbable that certain conditions may arise in nature when these vapours may be much more liable to this influence than we find them in our imperfect experiments. We have seen that a solution of sulphate of soda or water in a pure state may be brought by the abstraction of caloric to such a condition of unstable equilibrium, that the slightest perturbating cause will immediately reduce it to a solid form. If we admit that the globules which form the clouds are capable of being placed in a similar condition, we have sufficient data to explain all the phenomena that occur in the production of hail. Any nucleus formed within a cloud of this state would create around it a deposition of all the neighbouring particles, and the size of the hail-stones would be dependent upon the thickness of the cloud they had to traverse. In the storm of Ordenburgh, in 1825, mentioned by Dr. Eversman, pyrites were found in the centre, and had acted like a nucleus round which the crystallisation had taken place. Where the centre is not formed by a foreign body of this sort, it has frequently been mentioned that it consisted of an opaque nucleus of a spongy nature, like congealed snow, which may be easily accounted for. The succession of concentric layers would be caused by the passage of the particles through strata of liquid globules not all at the same temperature, and the radiated structure indicates a gradual increase of crystalline action proceeding from the centre. The temperature of the hail-stones, which has generally been found below the freezing point, is a further corroboration of this view. The formation of butter is likewise, in all probability, another instance of molecular action of the same nature. It is well known that after the cream has been agitated for a certain length of time the globules suddenly coalesce, and by their union butter is produced. The sudden appearance of this product is the more remarkable, as it takes place at different temperatures, although more quickly at some than others, and not gradually, as might have been expected, which precludes the idea of its being owing to any caloric developed by friction. The most minute observations have been unable to show any material alteration in the appearance of the fatty globules at the moment before the butter is formed. Little doubt can be entertained of its being caused by some molecular action, engendered in the globules by the continued agitation they have undergone. Some of the most permanent gases likewise exhibit phenomena closely allied to the above, by their action on platinum and other metals. According to Dulong and Thenard, platinum foil newly beaten has the property of acting at the common temperature on a mixture of hydrogen and oxygen, but after a few minutes' exposure to the air it entirely loses that power, which may, however, be restored to it in a stronger degree than before by heating it in a covered crucible. If it be kept in a covered vessel, so as to exclude the air, it will retain the power without decrease for four-and-twenty hours. Platinum filings, made with an ordinary sized file, have the same property immediately after their formation, which they retain for above an hour. It has also been observed that a hollow ball of platinum has the power of condensing and absorbing different gases, which are generally disengaged at a temperature below the boiling point (Pouillet, *Elemens de Physique*, § 131). The action of the gases on platinum in all the above cases greatly resembles that of carbonic acid on glass, except that not merely simple lines, but the whole surface of the metal exerts its influence, and that the gases themselves are invisible.

* Continued from page 198.

NOTHING NEW UNDER THE SUN.

In the notice of the meeting of the French Photographic Society in vol. i. p. 250, we stated that an apparatus for the preservation of sensitised paper had been designed by MM. Davanne and Girard, and manufactured by M. Marion;

we at the same time mentioned that M. Frank de Villecholles had asked a question relative to a similar box invented by M. Cognacq. The latter gentleman has addressed the following letter to a foreign contemporary, on the subject:—

"I READ in the bulletin of the French Photographic Society that M. Marion had presented an apparatus for preserving positive papers. I have likewise read the article of MM. Davanne and Girard, in which I observe that they advise the use of chloride of calcium as a proper substance for preserving nitrated paper.

"Without disparagement to MM. Marion, Davanne, and Girard, it was I who first discovered the properties of chloride of calcium as a preservative substance. In the month of May last I had the honour of addressing you a letter" (the letter was not received), "in which I informed you that I had discovered a means of preserving nitrated paper; it is true that at that time I did not consider it advisable to indicate the use of chloride of calcium, but it is very easy to ascertain now, that the various apparatus sold to MM. Aguado, Collard, De Vuillefroy, Gabriel de Kumine (Rumine?), and others, do not contain anything beside chloride of calcium.

"I hope you will receive this protest, which will be the last. It is sufficient for me to have proved, in a decisive manner, that the priority of this discovery cannot be contested with me.—Agréez, &c., H. COGNACQ."

[In support of this letter, Messrs. L. and H. Wulff addressed a letter to the Editor of the *Revue Photographique*, in which they stated that a description of the apparatus was published in his paper and in other journals in June of last year; and that they had delivered several of these boxes to men of mark among photographers. They state further, that last October M. Marion sent to them for one of these boxes for a M. Dol, of Cagliari, and the box was accordingly sent to him, together with a bottle containing the chloride of calcium. This box and bottle were returned to them a few days later by M. Marion, with an intimation that he was not quite satisfied with the apparatus, and begged them to forward it direct to M. Dol.

They add to their letter certificates from well-known photographers, stating that they had purchased similar apparatus of them some months back.

The *Revue* winds up the publication of the letters by stating that Messrs. Davanne and Girard have discovered the properties of chloride of calcium too late. We shall no doubt have an early opportunity of forming an opinion on the subject in dispute; meanwhile we may state that we have been shown one of the cases manufactured by M. Marion, though, of course, we have not yet had an opportunity of testing its merits; but judging from appearance, we see no reason to doubt that it will answer the purpose for which it is constructed. As to the degree in which it may resemble the apparatus of M. Cognacq we are not in a position to speak, inasmuch as we have not yet seen the latter.—ED.]

M. NIEPCE ON THE PRESERVATION OF LIGHT.

THE following are the directions given by M. Nièpce de St. Victor for obtaining photographs by means of light stored up in tubes.—*Cosmos.*

"Use paper prepared with ammoniacal chloride of silver, as it is more sensitive than that prepared with chloride of silver alone.

"At the moment of opening the tube, a little water must be inserted inside in such a way as to well moisten the pasteboard, and any water not immediately absorbed must be allowed to run out; and the tube again closed, and heated over a spirit lamp until it has reached a temperature too high to be borne by the naked hand (about 150 degrees), then opened directly, and applied upon the thin paper bearing the engraving, which serves as a negative, and the results will be the reproduction of the engraving on the sensitive paper beneath.

"The pasteboard ought to be strongly impregnated with tartaric acid, and insolated for four or five hours in the month of July. Pasteboard impregnated with nitrate of uranium does not require to be insolated above an hour; but it loses the acidity communicated by the light much more rapidly."

M. Plumier has informed us that the best sensitising liquid for preparing the paper for these experiments is composed as follows:—Dissolve 12 parts of nitrate of silver in 100 parts of distilled water, then add ammonia drop by drop, and at the same time shake the solution until it is dissolved. The solution is at first brown, but eventually becomes perfectly limpid: it is advisable to boil it for some minutes to restore it to a neutral state.

COMMUNICATION FROM THE FRENCH PHOTOGRAPHIC SOCIETY.

WE have received a communication from M. Martin Laulerie, the Secretary of the French Photographic Society, written, apparently, under the impression that we have not informed our readers that it is the intention of the French Society to hold an exhibition in the ensuing month. We need scarcely remind our readers that we announced the fact some weeks since, and that we have subsequently given all particulars published respecting it, including the rules intended to regulate the exhibition. Rule 2 has been since modified, as will be seen on reading the annexed translation of a letter, which appears to be an appeal to photographers individually. We may add that we sincerely hope the appeal may be successful in inducing a good number of English photographers to sustain our national credit.

"Sir,—I have the honour to remind you that the third public Exhibition of the French Photographic Society takes place, this year, from the 1st April to the 15th June, at the Palace of Industry, in a place specially set apart for it, and concurrently with the exhibition of paintings. The committee invite all photographers, whether native or foreign, to send photographs, in order to give this Exhibition the importance and interest of a really universal Exhibition, which will allow of a correct estimate being formed of the progress of the art in different countries.

"Although the regulations of the Exhibition have been already published in the monthly bulletin of the Society, the committee consider it advisable to remind you, personally, that objects intended for exhibition must be forwarded to the Secretary, M. Martin Laulerie, 11, rue Drouot, Paris, between the 1st and 15th March next.* As the jury, appointed to examine the works sent, meet on the 20th March, the committee have been obliged to fix the date of the 15th March* as being the latest for receiving proofs.

"If, sir, it be your intention to take part in this Exhibition, I beg you, in the name of the committee, to let me know as soon as possible, without waiting until you dispatch your parcel.—I have the honour, &c.

"MARTIN LAULERIE."

DISCOLOURING OF THE SILVER BATH.

BY H. FRANCIS.

DISCOLOURING of the silver bath in which albumenised paper has been prepared, is a constant complaint among photographers. Kaolin is generally recommended, and answers very well; but is not readily to be got even in London. We have had in use for some years, common pipe clay, which answers as well as kaolin, is much cheaper, and can be got in any part of the world. After we have prepared as much paper as required, we return the silver solution into a large bottle, which has about a pound of pipe clay in it, shake it well, and leave it to settle for the next day's use, when it will be found quite colourless. We would also recommend those who are in the habit of

* A delay of twelve days is accorded to foreign artists who shall give notice of their intention to exhibit *previous* to the 20th March next.

doctoring up a spoilt negative bath, to at once make a new one, and throw the spoilt one into the paper bath with the pipe clay, as we find it answers for paper as well as a new bath, of course adding a little silver to make up the difference between the strength of the two baths.

Critical Notices.

Stereographic Views of Chatsworth. By Mr. Poulton.

The idea of putting Chatsworth into the stereoscope is an exceedingly happy one, and considering the gorgeous magnificence of the grounds and the beauties of this "Palace of the Peak," we think it ought to be done in the best manner. We happen to know that in the summer of 1857 the duke contemplated thus illustrating his palace for the purpose of private distribution, and had he lived no doubt he would have carried out his idea, but death removed him ere he could accomplish the task of placing in the most unique of all modern instruments that most princely of all mansions, the Palace of the Peak, to which his own good taste and kingly magnificence contributed so much in making it what it is. Chatsworth may be considered as the finest of all the seats of the English nobility, and in looking at the views which Mr. Pulton has executed, we can form a pretty good idea of the extent and beauty of this place. As we look at slide after slide we are forcibly struck with the similarity which exists between many of the views and the Fairy Garden and Palace at Sydenham. In both we see the traces of the master hand who designed them. The view of the "Portland Walk" in the Ornamental Gardens could easily be passed off as the entrance to the Crystal Palace. As to the generality of these slides, we are sorry we cannot indorse the opinion expressed by the publisher that, "all who have seen these slides (which delineate scenes in this most beautiful of England's seats) have pronounced them to be of a very high order." We heartily concur in our approval of the expression that Chatsworth "is the most beautiful of England's seats;" but that the slides are of a high order we cannot allow. In the selection before us there are few "scenes;" they mostly comprise floral and botanic studies, without the necessary accompaniment of colour; and any one who would purchase this series in the hope of securing happy recollections of pleasant scenes would be sadly disappointed, because they chiefly consist of views of the most uninteresting kind. They are bad as photographs, and as artistic selections much worse.

Practical Photography on Glass and Paper. A Manual containing Simple Directions for the Production of Portraits Views, &c. &c. By Charles A. Long.

If the law of supply and demand be applicable to the production of elementary photographic treatises,—and we see no reason to doubt it—then, indeed, must the demand for photographic works be great, as the supply keeps up, and every few weeks we have to notice a new face in the field.

Of the work before us we are somewhat at a loss to say much. It is termed a manual of "practical photography," and as such we do not exactly see in what hands it can be most useful. The hints which it contains are by no means new to any one who is himself a "practical photographer,"—therefore it can be of no possible use to any one who has a knowledge of the manipulation of the positive and negative processes; while to the amateur it is scarcely adapted, as there is too profuse an interspersion of technicalities.

Moreover, although this is announced as the "fourth edition," there does not seem to be that amount of sequence of thought which is so requisite in a work which simplifies any art. It is evidently the production of one who has a good knowledge of photography, and all the requisites to produce a good picture; but he has not the power to express his meaning in language adapted to the mind of the beginner in the art of photography. For it must be borne in mind that not a few who follow the art of photography, are at the outset quite ignorant of the very simplest elements of chemical knowledge Therefore, a work which is intended to teach such beginners should be as free as possible from the technicalities to which we have alluded. It contains some hints, however, that will be of use even to the "practical photographer,"—not that he will learn much from them, but they may recall some forgotten fact to his mind.

Lessons on Colouring Photographs.

RELATIONS AND HARMONY OF COLOUR—(*continued*).

We have been speaking hitherto of the more striking and apparent sources of harmony arising out of judicious contrast. Harmony in colouring may, however, arise from various sources, and next to that of contrast the harmony of *analogy* is, perhaps, the most important, comprising as it does an infinity of varied and refined beauties, "too subtle to be defined, too intricate to be easily understood, and often too exquisite to be felt by the untutored eye." The harmonies of contrast are most generally produced by the juxtaposition of the primary and secondary colours, and those chiefly used in some approximation to their full hues. The harmonies of analogy arise from the judicious arrangement of the varied tints and shades of any single colour; from the arrangement of full hues after their natural gradation as seen in the solar spectrum; or from happy arrangement and gradation of tertiary and semi-neutral colours. To the production of good results in this respect, good taste, careful observation, and a cultivated eye are absolutely essential; for in proportion as the effects are delicate, the mode of producing them is less obvious. Of this class of beauties it has been well observed by Field in his "Chromatography," that "they are at once less definite and less generally evident, but more delightful—more frequent in nature, but rarer in common art;" he adds that they at the same time "give a boundless license for the display of the most captivating harmonies of colour, and the most chaste and delicate expressions." On this subject it is evident no definite rules can be given; we have said sufficient to be suggestive of its importance, and to commend it to the careful study of the reader.

Somewhat allied to the last source of harmony is that arising out of the prevalence of any given tone throughout a picture, producing an effect analogous to throwing upon it a coloured light or viewing it through a tinted glass. This effect does not, indeed, come strictly within the true meaning of harmony, although the principles and practice of many good painters, confounding tone with harmony, have at times substituted the one for the other. It has the effect, however, occasionally of reconciling in some degree discordant arrangements of colour. Where the picture is intended to appear suffused by a coloured light, or in other words, where a certain tone is intended to prevail, care must be used that every colour in its own degree shall be properly modified. For instance, if a warm tone is intended to characterise the picture, the reds will approximate to scarlet, the scarlets to orange, and the yellows to orange; the greens will lose some amount of their blue and acquire yellow, the purples will incline to red, and the blues approximate to a warm grey. Thus all the colours containing red and yellow become heightened by the prevalence of orange, which at the same time somewhat neutralises the blues and colours of which blue is a prevailing component. As whatever may be the inherent colours in the model, the painter is always master of the tone which shall prevail, he may often avail himself of this fact to produce pleasing effects, or to neutralise the influence of any mass of unharmonious colour which of necessity belongs to the picture.

The harmonies of contrast are always the most striking and attractive, those of analogy the most subdued and delicate. In portraiture, therefore, where it is desired to give the utmost importance and prominence to the face, the latter class of harmonies should prevail in the accessories. The dominant colours of the complexion being ascertained and reproduced, all accessory effects, whether in draperies or background, should be chosen to give value and prominence to the face by contrast, the harmonies of analogy only prevailing so far as these accessory colours themselves are concerned. If, on the other hand, from any inherent defect or deformity in the model, it is desirable not to give too much prominence to the face, the attention may be drawn from it by the employment of the harmonies of contrast in the

colouring of the accessories. The best effect will, however, be produced by the judicious combination of both kinds of harmony, taking care, in the introduction of accessories for the sake of colour, that they are not incongruous with the character of the picture, and that they are so distributed as to produce a general symmetry and to avoid the spottiness of effect which will easily arise from bad arrangement of minor matters.

The photographer who wishes to excel in the colouring of his productions will do well, whilst acquainting himself with the principles on which harmony depends, to avail himself of every opportunity of studying the works of great painters, and critically ascertaining to what extent and how these principles are carried out. This will be found a valuable method of fixing them in his mind. At the same time let him endeavour to examine and analyse the colours of nature, which imitative art can, at best, but endeavour to reproduce. In speaking of portrait painting, Sir Joshua Reynolds says, "avoid the chalk, the brickdust, and the charcoal, and think on a pearl and a ripe peach." It would have been better, with all due deference to so great an authority, if he had said "think of the natural hue of the human face."

(To be continued.)

Photographic Chemistry.

CHEMICAL MANIPULATIONS—*(continued).*

Reduction (continued).—We now proceed to the *second process by reduction of the chloride of silver.* All liquids containing silver, but which have no mixture of cyanide of potassium or hyposulphite of soda, may be collected together in a vessel, and hydrochloric acid, or a solution of common salt, added; precipitation will immediately commence, and a heavy white precipitate will be thrown down: the hydrochloric acid, or solution of salt, whichever is employed, must be added in excess. When the precipitation has ceased, the liquid should be left to settle closely at the bottom of the vessel; after which, the clear liquid should be drained off, and the precipitate washed, either on the filter or by decantation, and reduced to a metallic state by one of the following processes:—

1. *By means of zinc and sulphuric acid,* as follows:—Pour on the wet chloride at least double its volume of water, containing about $\frac{1}{10}$th of sulphuric acid; then put in it a piece of thick zinc plate, and leave it there for about twenty-four hours; the chloride of silver is reduced, and chloride and sulphate of zinc is formed, and metallic silver, which will be found in the form of a white powder. This powder is pure silver, and should be washed and filtered, and then dried.

2. *By means of potass and sugar.*—The chloride of silver to be reduced is placed in a flask or a capsule, and about double its volume of dilute solution of caustic potash (1 part of potash to 9 of water), in which a little sugar has been dissolved, is added, and heat applied until the liquid is brought to a state of gentle ebullition. When the blackish powder, which results from this treatment, after being washed in several waters, is entirely soluble in nitric acid, the reaction may be considered at an end. This powder is likewise pure silver.

This latter process does not allow of the gold being recovered at the same time as the silver; a different treatment is required. The residues, containing at the same time gold and silver, should, by means of evaporation, combustion, and calcination, be brought to the condition of ashes, and treated with aquafortis—which is a mixture of 2 parts of hydrochloric acid and 1 of nitric acid—and an insoluble chloride of silver is thus obtained, which is separated by filtering, and heated by one of the methods we have indicated: the liquor then contains chloride of gold, the metal of which is precipitated by means of sulphite of soda.

The following is a *dry method* for obtaining metallic silver from the chloride; but we may mention that, in lieu of the carbonate of lime, Spanish white, or caustic potash, may be employed:—

Dry chloride of silver	100 parts.
Carbonate of lime	70 ,,
Charcoal	4 ,,

These substances should be mixed intimately together, and put into a crucible, and heated to a strong red heat for a little more than half an hour. When thoroughly cold, the crucible may be broken, and the pure silver will be found at the bottom. There is a very simple method of extracting the silver from a single bath, which consists in the employment of metallic copper. The copper should be cleaned quite bright when immersed in the bath, and the latter should also be clear, and kept well covered during the operation. The action should be allowed to continue for twenty-four hours, and it will be found a material assistance if the vessel containing the mixture be in a warm place. The resulting precipitate, which may be removed from the copper by gentle friction with the finger, must be filtered from the blue solution (nitrate of copper), and washed once or twice with very weak ammonia water, and lastly with pure water, until a drop of the liquid as it comes from the funnel, received upon reddened litmus paper, does not restore the blue colour of it; the precipitate when dry will be pure metallic silver.

(To be continued.)

Dictionary of Photography.

BROMIDE OF AMMONIUM.—NH_4 Br. This salt may be obtained by the mixture of hydrobromic acid and liquor ammoniæ, or by the reaction of bromine upon ammonia. This latter operation should be performed in the following manner:—Pour into a flask with a long neck some pure bromine, and then cover it with water to prevent loss from volatilisation; next add caustic ammonia very gradually, drop by drop, with constant agitation, until the disengagement of gas (nitrogen) ceases, and the bromine disappears, leaving a colourless solution. Great care must be taken not to add the ammonia too rapidly, as the reaction is very violent, and the heat produced may occasion great loss to the bromine. When the reaction is completed, the liquid, evaporated to the crystallising point at a gentle heat, yields pure bromide of ammonium.

Bromide of ammonium may also be obtained in the following way:—Powder together, in a mortar, three parts by weight of bromide of potassium, and two parts of sulphate of ammonia; when intimately mixed together, introduce it into a glass retort with a very short and wide neck, connected with a large receiver; on applying a gentle heat to the mixture, double decomposition will take place, according to the following equation:—$K\,Br + NH_4\,O.\,SO_3 = KO.\,SO_3 + NH_4\,Br$. Sulphate of potassa will be left in the retort, and bromide of ammonium will sublime in the form of a white crystalline mass, which will condense in the neck and receiver. Continue the heat as long as volatile matter is given off.

It can also be obtained by adding carbonate of ammonia to bromide of calcium, filtering from the precipitated carbonate of lime, and evaporating the solution to the crystallising point.

Bromide of ammonium is a white salt crystallising in cubes; it is tolerably stable in dry air, and may easily be preserved in well-corked bottles; it does not become coloured like the corresponding iodine salt, and is preferable to bromide of potassium or calcium for photographic purposes.

BROMIDE OF CADMIUM.—Cd Br. May be readily prepared by placing bromine with six times its bulk of water in a flask, and then adding an excess of metallic cadmium in

filings; on allowing the mixture to stand for a short time, the bromine will unite with the cadmium and form a colourless solution of bromide of cadmium: this may be obtained in the crystalline form by filtering from the excess of cadmium, and evaporating the solution to dryness. Bromide of cadmium is a beautifully white crystalline salt, very stable in the air, and soluble in alcohol and ether as well as water; it is largely employed in collodion.

Bromide of Calcium.—Ca Br. May be prepared by placing in a flask bromine covered with water, and then adding gradually, pure caustic lime; this soon becomes slaked, and, if stirred from time to time, unites with the bromine very quickly: the operation must be stopped when the bromine has disappeared, but the liquid still smells of it. Then evaporate to dryness in a capsule, and heat to redness, to decompose the bromide of lime into bromide of calcium. After cooling, dissolve the residue in water, filter, and crystallise.

Bromide of calcium is deliquescent, and soluble in alcohol as well as water.

Bromide of Potassium.—K Br. This salt is composed of one equivalent of potassium, and one of bromine. It is prepared by adding bromine to solution of caustic potassa as long as the liquid remains colourless; there is thus formed a mixture of bromide of potassium and bromate of potassa, which is to be evaporated to dryness, and heated to redness in a crucible, by which means the bromate is converted into bromide with evolution of oxygen. This is then to be dissolved in water and crystallised. Bromide of potassium is very soluble in water, and crystallises therefrom in white anhydrous cubes. The commercial salt is usually quite pure enough for all photographic operations, especially if it be in large crystals. It sometimes contains carbonate of potassa, which is detected by adding, to a small quantity of a saturated solution of bromide of potassium, one drop of a solution of chloride of calcium: if no turbidity is observed, the bromide contains no carbonate; if there be a precipitate, the quantity will give some idea of the amount of impurity.

Bromide of Silver.—Ag Br. Is composed of one equivalent of bromide and one of silver, and is formed whenever metallic silver is brought into contact with bromine, either in the state of liquid or vapour; and also when a soluble salt of silver is added to a soluble bromide. Bromide of silver is of a very pale straw colour, insoluble in water and nitric acid, but soluble in ammonia, alkaline hyposulphites, and cyanides. When perfectly pure it is not very readily changed by light, but the slightest admixture of nitrate of silver renders it very sensitive to light. It is also sensitive to rays of the spectrum, which are without influence on iodide of silver. This peculiar action of light on bromide of silver has been fully discussed at p. 61.

(To be continued.)

A Catechism of Photography.

COPYING COLLODIONS.

Q. What is meant by the expression—Indirect collodion positives?

A. Images which are obtained by copying a negative in the camera.

Q. What is the chief advantage of such copies?

A. The opportunity which they offer of being enlarged or diminished in size.

Q. How is the change of size effected?

A. In the following way:—in front of the camera, at a specified distance from it, is placed the collodion negative which is to be copied. By means of a tube, or other similar contrivance, the rays of light are prevented from entering the camera except through the negative.

Q. What is the result?

A. An exact image of the collodion negative is found on the ground glass of the camera.

Q. Is the image so formed the same size as the original?

A. This entirely depends on the distance at which the negative is placed from the camera; and by altering the distance, the copy may be made either larger or smaller, at the option of the operator. If a negative portrait of a sitter be placed in the slide of the camera, and the instrument be carried into the dark room, and a hole be perforated in the window shutter so as to admit light through the negative, the luminous rays will form an image—after refraction in the lens—of the exact size of life, on a white screen placed in the original position of the sitter.

Q. What philosophical truth is learned from this?

A. That the object and the image are strictly in conjugate foci; and that, so far as the result is concerned, it is a matter of no importance from which point the rays of light proceed.

Q. How is the photographic picture obtained by this means?

A. By simply rendering the surface upon which it is thrown, sensitive to the action of light.

Q. What description of picture is produced?

A. A positive picture; that is, one in which the lights and shadows occupy their natural position.

Q. What sort of prepared surface should be used?

A. Either iodised paper or collodion.

Q. How long does the exposure occupy?

A. The time of exposure varies according to the sensibility of the surface and the intensity of the light. Experience, in this particular, is the safest guide.

POSITIVE PICTURES UPON GLASS.

Q. Can positive pictures be obtained upon glass in the camera?

A. They can; equalling in fidelity the daguerreotype, and free from the metallic glare of that process.

Q. How is the effect of a positive picture produced?

A. By backing the picture with black velvet or black varnish, which supplies all the necessary depth of shadows, and brings up the half tints and bright lights.

Q. Is ordinary collodion available for this process?

A. It is; but both in preliminary arrangements and subsequent developments some slight alterations are advisable.

Q. What suggestions can you offer as to the preparation of the collodion?

A. The following formula gives very excellent results:—

Ether	2 ounces.
Gun-cotton	4 grains.
Alcohol	1 ounce.
Iodide of potassium	4 grains.

Or the same preparation, exchanging iodide of potassium for iodide of ammonium.

Q. How should the nitrate bath be prepared?

A. In the following proportions:—

Nitrate of silver (crystallised)	80 grains.
Water	3½ ounces.
Nitric acid	2 or 3 drops.

Q. How long should be the exposition in the camera?

A. Much less than when a negative picture is desired; as the photogenic action is almost instantaneous.

Q. How is the image developed?

A. By pyrogallic acid; sulphate of protoxide of iron is frequently employed. When pyrogallic acid is used, the quantity of water commonly employed should be doubled, in order to weaken the solution. Thus:—

Pyrogallic acid	1 part.
Water	500 "
Acetic acid	20 "
Alcohol	50 "

Q. Is acetic acid preferable to citric acid?

A. It is, as it renders the whites much more brilliant; the alcohol makes the liquid flow more uniformly over the glass, and, consequently, insures a more perfect picture.

Q. How is the sulphate of protoxide of iron employed?
A. In the following solution:—

Saturated solution of iron	... ...	100 parts.
Water	...	600 „
Acetic acid	...	20 „

This solution is poured upon the glass, and allowed to remain on the surface until the picture is perfectly developed.

Q. What is done as soon as the picture is developed?

A. It is thoroughly washed in pure water, and fixed with a solution of cyanide of potassium, in the proportion of two parts to 100.

Q. Cannot these pictures be fixed with hyposulphate of soda?

A. They can, and with almost equal success; but experience has proved that pictures so fixed do not possess the same brilliancy of impression.

Q. The picture having been fixed, what is the next operation?

A. That of applying a coating of black varnish to the back. For this purpose the following is recommended:—

Essence of turpentine	... ...	100 parts.
Bitumen of Judea ...	... ...	20 „
White wax ...	... ...	4 „
Black bougie	... ...	1 or 2 „

These ingredients, having been thoroughly mixed together, are applied to the back of the glass with a badger-hair brush.

Q. Is it possible, as in the case of negative collodion, to remove the film from the glass to another substance?

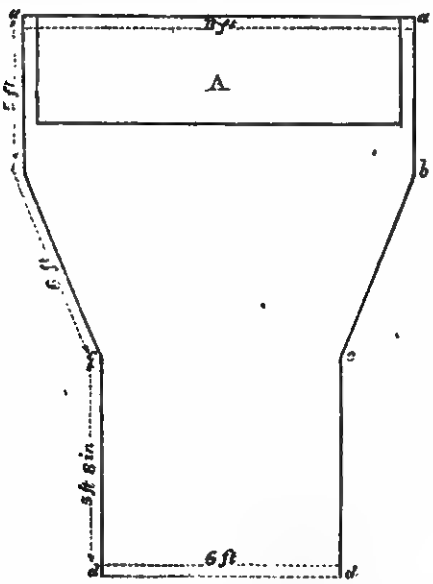
A. It is; and the results are generally very good.

(*To be continued.*)

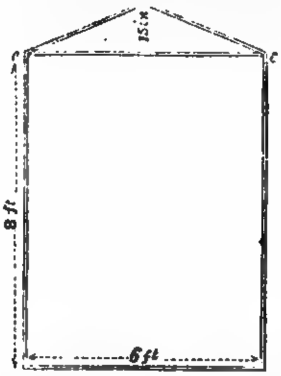
Correspondence.

A CHEAP TENT FOR TAKING PORTRAITS IN.

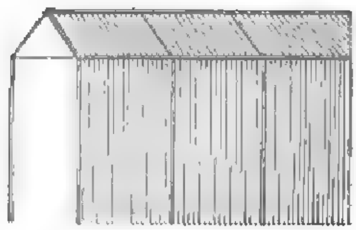
Sir,—The back is a wall, to which the framework of the tent is fixed in the same way as with a span-roofed greenhouse.



A is a raised platform, on which the sitter is placed; *a*, *b*, *c*, and *d*, are uprights of deal about two inches square, to support the slight span roof as in the accompanying sketch. The roof and one side are covered with *fine white calico*, nailed tightly on, and well brushed over with white wax dissolved in pure spirits of turpentine, and put on warm. This renders it perfectly waterproof. The other side is covered with coarse calico, rendered opaque by painting it black, but from *a* to *b* lined inside with fine white calico—to reflect a little light. The portion of the roof over the platform is rendered nearly opaque by a coat



of light blue paint. The end where the camera stands is either left open, or a curtain is drawn across it, hung with



rings upon an iron rod from *c* to *e*, according to circumstances.

H. Doubleday.

[We have seen some specimens taken in the above tent, and we must say that they are equal to anything we have seen done in the operating room. The pictures are clear, sharp, and in all respects well defined. The half-tone is perfect, and the shadows are admirably adjusted. The amateur who does not wish to incur the rather heavy expenditure of erecting a glass house, may, with all confidence, use this tent, which, from the foregoing, it will be seen can be erected at a very little cost.—Ed.]

SUGGESTIONS ON THE CAUSES OF FADING.

Sir,—I have for some time past been engaged endeavouring to find the cause of so many of my valuable positive prints fading, after the most careful toning and washing: in common with many of my photographic brethren, I have been almost ashamed to own the production of my own hand after the lapse of a year or so. Thinking, at first, as most would do, it was owing to imperfect washing, I afterwards paid the most careful attention to this part of the process. Still the same evil showed itself—after a short time came visible signs of decay. The next suggestion to my mind was, that the cause might probably be old hyposulphite used in fixing the print after toning. I then carefully avoided it, by employing fresh with each print—at the same time avoiding a sulphuretted toning bath by keeping up the supply of gold, and not using it many times over; but still I am subject to the same annoyance to a considerable degree, though not so much as if I had not paid strict attention to the above. After this, another idea struck me, that the paper upon which the photograph was taken might possibly contain the elements of destruction. Accordingly I set about finding the chemical and physical composition of paper, which appears to be old rags ground up by an iron roller into a pulp, and then subjected to the action of chlorine gas, which considerably improves the colour of them; the rag or stuff is then re-ground, and subjected to another action of bleaching, by a solution of lime, chlorided or slaked,

being put in the engine, and masticated up with the pulp. It is, or ought to be, then well washed out by means of water passing through the engine; but of course it is impossible, by any ordinary means, to free it of the bleaching matter after all this grinding, as it becomes completely beaten into its very fibre, and, in that state, it is made into paper; thus the purchaser gets a sheet of paper which, if photographed upon, is sure to produce fading.

I am pleased, however, to hear that a few of our leading paper manufacturers are turning their attention to the production of paper made from new rags, thus obviating the necessity of employing any bleaching substances in manufacture. I feel confident that, when it finds its way into the photographer's studio, he may then bid fair to rival the so-much-talked-of carbon prints in point of permanence.

Again, if paper is made of such rubbish as I find on examining samples it is, we may well complain of those illtimed specks which occur in the middle of many an excellent print. We are apt to lay the blame on the state and conditions of the chemical employed, but I feel confident in saying it is in one half of the cases owing to the impurities contained in paper upon which the photograph is taken, that those spots are produced. A sheet of paper that is made from highly bleached rags, is in texture very soft and open; and on the other hand, if made of good new linen rags it will feel hard and close ground, and look very transparent by transmitted light, with an absence of those dark specks, which are atoms of iron, buttons, and other impurities. WELLINGTON.

THE SALE OF POISONS BILL.

SIR,—Although the Sale of Poisons Bill possesses features which have been long desirable as a check to their reckless sale, yet, to me, for one, it will certainly be a very great disadvantage, and doubtless there are many others similarly situated. I am engaged in chemical pursuits as a profession, and unfortunately, am not of full age; now, as the bill stands, I shall be debarred from purchasing many preparations, absolutely needful to me, simply because they happen to stand on the proscribed list. Not being a photographer myself, I should not have written to you, had I not noticed that you take a lively interest in the sister sciences.

CHEMICUS JUVENIS.

Photographic Societies.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

THE following paper, by C. HEISCH, Esq., read at a recent meeting of the above Society, has been forwarded to us for publication.

OBSERVATIONS ON THE DRY COLLODION PROCESS.

I am not about to bring forward another new process, and possibly not to say anything new; but I think one object of societies like our own is, that each member should give the others the benefit of any observations he may make while working. During the past season I have been working at dry processes, and, like most others, spoiled a good many plates before I got any good results; and it is the hope of preventing some other beginner from spoiling so many which has induced me, in the absence of any regular paper, to make a few observations this evening. Until this last season I had never tried any of the dry processes, because I had never seen any pictures on dry plates which were not hard black and white things compared with those on wet plates (I do not, under the head of dry processes, include the honey, as that is rather used as a means of preventing the plates from drying); but at the beginning of last summer, Mr. Heath showed me some pictures taken by the Rev. Mr. Cleaver, which equalled anything I had seen on wet collodion. Mr. Heath kindly procured for me the processes employed by Mr. Cleaver, which I found to be Lyte's metagelatine process, with the addition of a little honey or citric acid to the gelatine solution; but the collodion he employs contains a large proportion of bromide, and on this, I believe, the beauty of his results depends. In the last number of the *Journal*, Mr. Cleaver has published his process, which differs in one or two points from the one he originally sent to Mr. Heath. You are all aware that I advocated the use of two equivalents of iodide to one equivalent of bromide of ammonium for landscape collodion, wet or dry, and I believe the condition of things to be just about this—that you may take six views on a wet collodion, with only iodide, and, by a proper management of stops, &c. five out of the six will be very good, but the sixth will not, though, by the use of a proper proportion of bromide, it may be taken well and easily; while, on a dry collodion, if it contain only iodide, for one view that you can take you will find five that you cannot, that is, if you look for anything like delicacy of half-tone and proper effect. I now always employ the same collodion for dry plates which I before described to the Society, using nothing but iodide and bromide of ammonium. Some difference of opinion exists as to the collodion best suited for dry plates, some advocating a pyroxiline made at a high temperature, some as expressly directing a low temperature to be employed. My own experience is in favour of a pyroxiline made at as high a temperature as possible, without producing an explosion, and using plenty of it in the collodion. It is but little use giving formulæ for making pyroxiline, as many very good ones are published; but it is impossible to publish the one great requisite—experience, and every one must make up his mind to make a good deal of bad pyroxyline before he makes any uniformly good. I make my collodion as follows:—

Pyroxiline	6 grains.
Ether	5 drachms.
Alcohol	1 drachm.

IODISING SOLUTION.

Iodide of ammonium	36 grains.
Bromide of ammonium	12 grains.
Alcohol	2 ounces.

Two drachms of this solution to six of collodion. (The alcohol is distilled first from chloride of calcium, and then from potash, and the ether from potash, so that both are anhydrous and free from all products of oxidation. They should be preserved in small bottles quite full.) This makes a very strong and highly iodised collodion, and requires a bath of proportionate strength; for in collodion, as in paper, if the bath be weak in proportion to the collodion the iodide is not firm in the film. This is the case to even a greater extent when bromides are employed than with a simply iodised collodion. The bath I find work the best is made thus: dissolve 1 ounce of nitrate of silver in 3 of distilled water, and 1 grain of bromide of ammonium, previously dissolved in a little water, making the whole up to 9 ounces, by the addition of water and ½ ounce of spirit of wine, filtering, and finally adding the remaining ounce of solution of nitrate of silver. It will be observed that the iodide and bromide are added to the bath in the same relative proportion as to the collodion. I have tried using them in different proportions, but never got the bath to work so satisfactorily. It is just possible that this may be accidental, but so it is. The salts of potassium may be substituted for those of ammonium in the bath, preserving the same relative equivalent proportions. I have been led to enter into these details concerning bromised collodion, because some of my friends have been troubled with streaky plates, &c., when endeavouring to use it, and as I believe it to be the proper thing for dry plates, they are not altogether out of place here. With respect to the various substances that have been proposed for coating the plates, I do not know that, as far as the results are concerned, any one is very superior to the others.

The great points seem to be to use it as thin as possible, so as to form a coating at all, and to put it on the plate in a proper manner. I prefer the use of metagelatine because of its convenience. It will keep any time when well prepared, which renders it superior to albumen, which must be used pretty fresh, and it may be used cold, which makes it much more convenient than gelatine. What I have used was according to Lyte's formulæ, only with the addition of more spirit. It consists of 1 ounce of gelatine, 18 of water, and 2 of spirit of wine. This insures the keeping of the solution, and makes it run very limpid. The addition of citric acid I am inclined to think no improvement; it appears to have a tendency to produce that great intensity which is the great evil of dry plates. With respect to the addition of a little honey I can hardly yet make up my mind, but I think it may give increased sensibility. For washing I have used the vertical bath, as recommended by Mr. Cleaver, and I believe that it is better not to wash the plates

too much. A quart of water will wash a dozen stereoscopic plates quite well. Much has been said on the necessity of drying the plates in an oven before coating them with the collodion, to prevent blistering. I have no doubt it is a good plan for those who have conveniences for it, but if the collodion be kept for some little time after iodising, and the metagelatine be thin enough, I have not found it necessary. I have found the collodion work well after keeping a fortnight or so. The coating the plate with the metagelatine is the most important part of the process, and it is the proper management of this that enables one to dispense with so much washing. When I first began I did as is usually directed, drained the plate after washing, poured on the preservative solution and worked it backwards and forwards on the plate for some time before draining it off, and nine-tenths of my plates turned out bad. The preservative solution has of course a much higher Sp. Gr than the film of water on the plate, and when thus mixed with it makes those whirling sort of marks which always accompany the mixing of solutions of different Sp Grs., and even if the movement of the plate be continued till all these whirls cease to be visible, the sensitive coat is often marked indelibly; moreover whatever nitrate of silver may remain in the film of water on the plate, is thus mixed with the preservative solution, which renders it necessary that the washing of the plate should be very perfect before the said solution is applied. By proceeding in the following manner I have never had a marked plate. After the plate is removed from the water bath, let it drain well with its lower edge on some blotting paper, and dry the back of the plate also with blotting paper. When well drained hold it quite horizontal (a pneumatic plate-holder is the best thing for this purpose), and pour some of the metagelatine all along on the shorter edges of the plate (about 2 drachms does for a stereoscopic plate), then tilt the plate very slightly, so as to make the solution flow in one slow, even wave to the other end of the plate, not slanting across it. The solution, being more dense than the water on the plate, forces the latter before it, and leaves only what is actually in the pores of the collodion; it is quite curious to see the quantity of water thus pumped out as it were from a plate which seemed perfectly drained. When the solution has all collected at the lower edge of the plate, tilt it slightly towards one corner and allow the excess to flow off, then pour on a second quantity of the metagelatine in precisely the same way, and at the same end of the plate as the first, and let it flow off in the same manner. This second quantity does over again for the first coating of a second plate. This plate should then be placed up on end to dry, when it is ready for use. The only other point on which I have anything to remark is the developing, and much depends on doing this sufficiently slowly. First, make a developer as follows:—

Pyrogallic acid	6 grains.
Spirit of wine	½ ounce.
Glacial acetic acid	½ drachm.
Water	5½ ounces.

After the plate has been well wetted with distilled water, pour over it a solution made by mixing ½ ounce of the above with ½ ounce of water and two drops of, or 30 grains, solution of nitrate of silver. This developes the picture very slowly, and of a feeble light brown colour, but the development may be continued till all the details are brought out in the deepest shadows. When this is the case, wash the plate and cover it with the undiluted developer with 4 drops of silver solution to the ounce; with this any degree of intensity may be obtained, but a rather feeble-looking negative prints best, as the peculiar colour of these dry negatives stops out the chemical rays very perfectly, much more so than would be supposed from their appearance. If you begin developing with a stronger solution, or one containing more silver, the high lights develop so much more rapidly than the rest of the picture, that they become quite opaque before the detail is half out. The plates are of course washed and fixed in the usual way.

According to *La Patrie*, a youthful chemist has hit upon a method of instantly removing nitrate of silver stains from the hands; and this not only when the stains are of recent date, but where the skin has been cauterised by the action of the substance in question any length of time previously. The valuable discovery, which removes the only barrier which prevents so many young ladies, and not a few of the sterner sex, from dabbling in photography, is simply *linseed*.

Miscellaneous.

Structure of the Luminous Disc of the Sun.—The extraordinary structure of the *fully luminous* disc of the sun, as seen through Sir James South's achromatic, in a drawing made by Mr. Gwilt, resembles compressed curd, or white almond soap, or a mass of asbestos fibres, lying in a *quaquaversus* direction, and compressed into a solid mass. There can be no illusion in this phenomenon; it is seen by every person with good vision; and on every part of the sun's luminous surface, or envelope, which is thus shown to be not a *flame*, but a soft, solid, or thick fluid, maintained in an incandescent state by subjacent heat, capable of being disturbed by differences of temperature, and broken up as we see it when the sun is covered with spots or openings in the luminous matter.—*North British Review.*

It is curious to reflect that the aids to photographic development will date within the last half-century, and are but little older than photography itself. It was not until 1811 that the chemical substance called iodine, on which the foundations of all popular photography rest, was discovered at all; bromine, the only other substance equally sensitive, not till 1826. The invention of the electro process was about simultaneous with that of photography itself. Gutta percha only just preceded the substance of which collodion is made; the ether and chloroform, which are used in some methods, that of collodion. We say nothing of the optical improvements previously contrived or adapted for the purpose of the photograph; the achromatic lenses, which correct the discrepancy between the visual and chemical foci; the double lenses, which increase the force of the action; the binocular lenses, which do the work of the stereoscope; nor of the innumerable other mechanical aids which have sprung up for its use.—*Curiosities of Science.*

Photographic Valentines.—We know not whether the postman looks forward to the arrival of St. Valentine or not, but we do know that some thousands of young ladies and gentlemen look with the greatest amount of anxiety and pleasure to the return of the day. Every year this species of sentimentalism begins to bud about the latter end of January; and in addition to the last year's stock, there are to be seen in the shop windows some of "the newest designs." We only allude to the matter because we see that the valentine publishers have not failed to avail themselves of the aid of photography. In some of the valentines we have seen, there have been photographs of neat designs, and certainly they looked better than the tawdry red and yellow daubs which sometimes may be seen. In other cases the valentine is formed complete, and a little oval left to insert a portrait of the sender.

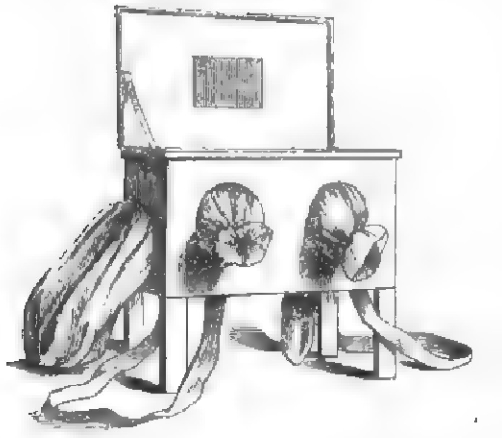
Photographic Notes and Queries.

IMPROVED DEVELOPING BOX.—COLOURING POSITIVES ON ALBUMENISED PAPER.

Sir,—Having myself derived much useful information from your paper, I beg to forward to you a stereoscopic picture of a developing box I have for some time been using for out-door stereoscopic work. I am aware that it much resembles one you have already described in vol. i. p. 179, but differs in some important respects. At first I tried to work in a box almost identical with the one alluded to, but found much inconvenience from the dark frame getting splashed during the washing processes; besides which, it was much in the way, excluding light, &c., consequently, I devised the one I now use. It has a sufficiently large hole in the left-hand side, with a black bag, lined with yellow calico, attached to it, into which I place the frame when not in use, avoiding all chances of getting it wet, and giving more space for the necessary manipulation. I also have another place in the bottom, with a similar bag fixed to it for the bath, saving the amount of room that would otherwise be required in lifting out the plate when sensitised. In front I place three thicknesses of yellow calico, and have a door to close on this for convenience of carriage. The legs are made to pull out, simply fitting tightly, so that, when packed, it is an ordinary-looking box. Its size is—length 18½ inches, breadth 10½ inches, depth 11 inches. Mine, made of

American birch, cost me 7s. 6d. for the box, and a trifle more for linings, &c. I also inclose a view, the negative of which was manipulated in the box about a week since.

I have also remarked in your paper many inquiries respecting the colouring of albumenised prints, from the



difficulty of making the water-colours adhere. The plan I follow, and believe to be the most simple, is this:—After being mounted I fill a camel-hair brush with water, and brush the print over with it until the water flows evenly, which it quickly will do. I then remove the superfluous moisture by blotting-paper, when it can be painted as easily as upon drawing-paper; when thoroughly dry, I size it over with a tolerably thick solution of gelatine, which I have never found to displace the colours, and varnish with any good varnish (I generally use copal). J. E. C.

[Judging from the specimen which our correspondent has favoured us with, we should think that the manipulations of the collodion process could be very well carried on in such a developing box as he has described. The picture is very clear, and is perfectly free from fogging.—Ed.]

SPOTS IN THE COLLODIO-ALBUMEN PROCESS.

Sir,—Now that collodio-albumen claims so much attention, I presume that anything at all calculated to remove obstacles out of the way of its practice may be of service to some of your numerous readers. Indeed, I have to acknowledge myself much indebted for many useful hints that are thrown out from time to time in the pages of your valuable periodical.

Having lately been engaged in developing some collodio-albumen stereoscopic plates, I have been much annoyed by the appearance of a number of small black specks, perfectly opaque, which gradually increase in density and somewhat in size as the development of the picture proceeds, which, of course, spoil the result; though, in other respects, the pictures are everything one could wish.

Now it occurred to me that these specks were occasioned by the presence of minute particles of iron, which had become attached to the surface of the albumen whilst the plate was in the plate-box. I accordingly examined the latter—which is a tin one—(as recommended in preference to wood for storing prepared plates), and I found, on shaking it on to a piece of white paper, that it contained a quantity of minute particles of metal, which had evidently become detached by the friction of the glass plates against the sides, some of which had attached themselves to the albumenised plates, probably, before they had been coagulated by the sensitising liquid. Here was the cause of my annoyance, and consequently a remedy was soon to be found.

Thinking that these few hints may be of use to some who, like myself, may have experienced that photography, like everything else under the sun, is "vanity and vexation of spirit" at times—I place them at your disposal.

Bene-velis.

TONING BATHS.

A correspondent has drawn our attention to the many toning baths mentioned in different numbers of the "Photographic News," and has asked which we consider the best, on the whole, for a beginner to adopt. We cannot presume to decide, authoritatively, as to the respective merits of these baths; each has its advocates, and doubtless, with care, each would give equally good and permanent prints with the others. Our own opinion is that the one at pp. 33, 34, is the one most likely to give satisfactory results in the hands of beginners. We have, recently, been using the plan there described, and are very pleased with the results. We have found it an improvement to soak the prints in a bath composed of ¼lb. of common washing soda in a gallon of water after they are removed from the toning bath. When they have remained in the soda solution for about ten minutes, remove them to the hypo. solution. For convenience we append the synopsis of the process:—

Float paper on salting bath 1′ to 5′.
Hang up to drain.
Float on exciting bath 5′ to 10′.
Hang up to drain.
Expose in frame.
Wash in common water.
Wash in salt and water (salt 1, water 100).
Immerse in toning bath.
Immerse in soda solution.
Fix.
Wash perfectly.
Dry.

Salting bath:—	
Albumen	1 ounce.
Good common salt	30 grains.
Exciting bath:—	
Nitrate of silver	120 grains.
Water	1 ounce.
Toning bath:—	
Chloride of gold	2 grains.
Water	5 ounces.
Soda solution:—	
Washing soda	¼lb.
Water	1 gallon.
Fixing bath:—	
Hyposulphite of soda	1 ounce.
Water	3 "

MAJOR FITZMAURICE'S NEW LIGHT.

At pp. 56 and 142 of the "Photographic News," will be found references to the above new light; and in the *Times* a few days ago, the following paragraph appeared, which we think may be of interest.

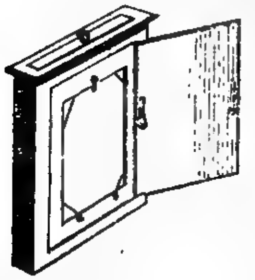
Major Fitzmaurice's New Light.—On Tuesday night (February the 15th) the Hon. Major Fitzmaurice visited the Penrhyn Slate Quarry, near Bangor, North Wales, for the purpose of exhibiting his newly-discovered light. The first experiment was conducted in a deep and long tunnel. The apparatus, which is quite portable, was placed at one end of the tunnel. The light produced from this was steady, pure, and so surprisingly brilliant, that it completely illuminated the whole length of the tunnel, and rendered a written paper distinctly legible at a distance of 300 yards. The apparatus was next brought into the open quarry. Here also the results were most extraordinary. The numerous steps of the quarry, some even at a distance of 800 and 900 yards, were as clearly seen as in daylight. Mr. Francis, the superintendent of the quarry, and a party of friends, took the most attentive interest in this wonderful discovery, and all expressed their gratification and surprise. A young Irish lady who was present exclaimed, "Why, the sun is a fool to it." This light is applicable to a variety of purposes. The colours of furniture, dresses, &c., are rendered unusually vivid, and photographs can be taken in ten seconds. It is free from injurious fumes, and consequently does not affect paint, gilding, or articles of delicate colour. It is also easily manufactured and very cheap. A light equal to that of

thirty candles can be produced at a cost of one halfpenny an hour.—*The Times.*

[Can any of our readers favour us with further particulars respecting this important invention; it is likely to prove of such value to all classes of photographers that we are anxious to possess more reliable information on the subject than has yet appeared.—ED.]

NON-REVERSIBLE PICTURES.

SIR,—To take a non-reversible portrait, the usual spring attached to the door of the dark frame must be taken out, and two silver ones affixed instead, thus (*see cut*); for the largest size the frame will take, just to touch the plate at each side; for the smaller sizes, two silver hooks at bottom of carriers, to drop the plates into, with a small silver button (*as in sketch*) at top, are sufficient—the two springs on the door keeping the carrier in its place.



Prepare the plate as usual—one free from specks; wipe back dry (first with blotting paper lightly, finishing with a piece of soft clean rag); place same in dark frame, collodion side towards the door, and not the shutter; and if the object has been focused by reversing the ground glass, or by laying a piece in the dark frame so reversed (which is more certain), the same good results will be obtained, as far as definition, as in a reversed one. M. D.

YELLOW ILLUMINATING MEDIUM FOR THE GLASS ROOM.

SIR,—If any of your numerous readers wish for a really cheap and good yellow light in their dark rooms, and if the subject is not already exhausted, I can inform them that I have, for the last three years, had no other light to work by than that admitted through a common glass window, 2 ft. × 3 ft., simply painted on the inside with a well ground mixture of orange lead, yellow ochre, and orange chrome, mixed with boiled linseed oil and a little oak varnish; with this I gave the window two or three coats, and have not since touched it with paint. It gives abundance of light in dull weather, is full south, and, in bright sunshine, I have never had a single foggy picture from any cause. I never take any precaution to shade the window, although there are numerous small pin-holes in the paint. Without the necessity of using paper or gamboge, the foregoing has answered well, and is very economical. X.

GRADUATED BACKGROUND.

SIR,—A few weeks ago, I saw a great many remarks on "backgrounds" with light centres, the following method I find suits my purpose: a frame covered with stone-coloured calico, and in the middle I have placed a small piece of wood in the shape of a star, painted light blue; from this I have a long string, which pulls through a brass ring at the top of the background. By pulling this string during the exposure of the glass, it turns the star round with some rapidity; you will find this produces a very perfect white light round the head of the sitter. This plan will apply as usefully to positive as to negative photographs. AN AMATEUR.

IMPROVEMENTS IN THE STEREOSCOPIC CAMERA.

SIR,—I see in the "PHOTOGRAPHIC NEWS," p. 275, suggestions for improving the stereoscopic camera. I have for some time past made them as there suggested; I have usually made a long table about two feet long, hinged in the middle so as to fold in half, upon which slides from end to end a swivelled board, upon which the camera is placed, and which is regulated by screws to give the proper angles. The way I use it when taking a distant view is as follows:—Supposing the operator to be standing behind the camera when placed for taking the view, he would begin by placing the camera at the right-hand end of the long table, and then taking the cap off the left-hand lens, he would next pass the camera to the left-hand end of the long table, and take the cap off the right-hand lens, when the view will be taken on the plate the same as if taken with the one-lens camera and shifting back, and would not require to be transposed as if taken with the twin lenses at the same time.

THOS. H. CROUGHTON.

27, *Greenhill's Rents, Smithfield Bars, E.C.*

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—I wish H. S. I., when he has finished his useful *synopses*, would give us essays on the point "What chemicals *will* tenant the same abodes in peaceful succession,"—how *few* dishes, funnels, and temporary receptacles each process *positively* requires. The same boat would hold, we know, the fox and the cabbage, though the ferryman had to return again for the goose; but young chemists are apt to be nervous. Again, short "Things that will *do*," after the manner of "What to avoid," would help photographers under difficulties, and hinder none. The Birmingham Dry Plate Co. has everlastingly obliged me by telling me that a slate-pencil would *do* to stir with.

PHOTO. BEYOND RAILWAYS.

GELATINE PAPER.

SIR,—In your "Catechism of Photography," I see "gelatine paper" mentioned as used for transferring the collodion film; would not this be liable to cause some confusion? as what I understand to be gelatine paper is gelatine made into a very thin sheet. Would not "gelatinised paper" be better where paper coated with it is intended? I see an advertisement in this number of the "PHOTOGRAPHIC NEWS" of gelatine paper, but this surely cannot be of the kind I sent you; if so, it is immensely too dear to be of any use. What I sent you was only 4½d. per sheet. It is foreign, probably French, and, no doubt, could be sold for less by taking a quantity.

THOMAS BARRETT.

MOULDED GLASS DISHES.

SIR,—In reply to your correspondent in a recent number of the "PHOTOGRAPHIC NEWS" respecting moulded glass dishes, I am glad to inform him I have succeeded in getting them made in three sizes, namely, stereoscopic, 9 × 7, and 11 × 9; that the bottoms are quite *smooth* and *flat*, and that they are quite *nonangular*, the sides springing from the bottom with a curve, and the corners being rounded, with a well-formed lip at one of them for pouring from.

JOSEPH JNO. PYNE.

68, *Piccadilly, Manchester.*

ANSWERS TO MINOR QUERIES.

STRENGTHENING OF ALCOHOL.—*J. W.* We gave the most usual method of obtaining strong alcohol in our Dictionary, vol. i. p. 210. Our correspondent asks if there is not a simpler way of increasing the strength of ordinary spirits of wine in small quantities, without going to the trouble of distilling it. Perhaps the following plan will be of use to *J. W.* Take a wide mouthed bottle, and having nearly filled it with the spirit, place a clean and moist piece of bladder over the mouth, and tie it down so that no air can get in. Bladder possesses this curious property, that whilst it will allow the vapour of water to pass through, it will keep back that of alcohol, and consequently, if the bottle be placed in a tolerably warm place, the water will gradually evaporate from the alcohol, and leave the latter correspondingly strengthened. Of course this is not a very quick process, and can only be adopted when the alcohol is required merely for *future* use. If a mark be made on the bottle to show the original height at which the spirit stood, the diminution in height of the liquid will show the amount of water lost by evaporation.

Lubricator for Brasswork, Screws, &c.—*A Mechanic* has had great difficulty in unscrewing the flange from the brass mounting of his lens, and cannot unscrew the lens at all. He inquires if we can recommend him any kind of grease or oil which can be applied to such screws without causing them to clog in a short time. We have long used the following plan, and can recommend it, not only for such purposes as the above, but for joints, taps, stopcocks, and all similar things which are intended to remain moveable and yet air tight. Take a piece of Indian rubber heat it at a temperature of about 260°, till thoroughly melted; it will now form a sticky mass, which has the valuable property of not altering or solidifying when exposed to the air. A little of this smeared on the screw, will insure its always working properly. This melted caoutchouc is a most valuable material to keep in the laboratory, as its excellent lubricating powers enables it to be applied to so many useful purposes.

The Alabastrine Process.—*Photogram.* The same causes which induce the loosening of the collodion film at times in the ordinary process, will do so in an increased degree when the picture is subjected to any bleaching agency. These causes are generally, the use of a new or contractile collodion, the use of an acid nitrate bath, the immersion of the coated plate into the nitrate bath before the film has sufficiently set, or with a thick edge formed from the drawing of the collodion, or from carelessness in washing. If all these causes are avoided, then try the remedies suggested in a former number of the "News," vol. i. p. 23. A gentleman, who has much experience in the production of alabastrine pictures, informs us that by the use of ordinary precautions, and the use of a collodion adhering tenaciously to the glass, he has not, out of many hundreds of pictures so treated, lost a single one he wished to preserve by washing off the film. He is using the advertised alabastrine solutions, and a collodion for the purpose, dignified with the name of American Excelsior Collodion.

Liver of Sulphur.—*W. L. M.* Liver of sulphur consists of tersulphide, pentasulphide, and intermediate sulphides of potassium, according to the proportions of the ingredients employed, mixed with sulphate, and often at the same time with carbonate of potassa. It is prepared by gently heating sulphur with carbonate of potassa in covered earthen or cast-iron crucibles. The common proportions are two parts of carbonate of potassa and one of sulphur—the quantity of the latter ingredient should, however, be increased a little. If a solution of this body in water be used to precipitate the silver residues as described at p. 270, our correspondent will find that sulphide of silver will be at once formed.

TO CORRESPONDENTS.

Our next Number (26) will conclude Vol. I.; and will contain, in addition to the current photographic news of the week, a very perfect and copious Index.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

We must beg our correspondents not to send glass plates through the post, except they are securely protected against breakage.

Photo. beyond Railways.—1 and 2. We have not yet fulfilled our promise, but hope to be able to do so early in the new volume. 3. We do not like a protosulphate of iron developer in the waxed paper process. Gallic acid has succeeded best in our hands. 4. Nitric acid is the best thing to clean a dish with, even when wanted for an ammonio-nitrate bath. Of course rinse the dish well in water after the acid. 5 and 6. Archer's transferring varnish, being a solution of gutta percha or benzol, will do as it is for coating paper trays. Coal naphtha is impure benzol. 7. See the editor's "Handbook to the Waxed Paper Process." 8. It is not patented; we intend giving an account of it as stated at 1.

A. Davidson.—1, 2, 3. It will be almost impossible for you to obtain satisfactory results with a combination made of such lenses as you describe. The manufacture of a portrait combination is one of the most difficult departments of practical optics, and the proper arrangement of the curvatures, &c., requires high mathematical skill. 4. Good sealing wax is not considered to have any injurious action on the nitrate bath.

H. T. (M.R.C.S.)—1. Not very favourably. 2. We prefer the aplanatic. 3. It is not intended for portraiture.

G. R. (Birmingham).—We are obliged for your communication; the plan you suggest is, however, well known.

J. B . . . . . n.—1. If the alabastrine solution is properly prepared, it ought not to make the picture of a bluish colour. Prepare the solution as at page 180, or purchase some from the advertised agents. 2. A good negative should have the drapery and dark shadows as distinct in proportion to the intensity of the illumination on any other parts of the picture. 3. Perhaps the collodion had not settled, or the bath wanted filtering, either of these causes would occasion small holes over the negative. 4. We like nitric acid instead of acetic acid in the developing solution, in cases where the extra time required in the development is of no consequence.

J. B.—Many thanks for the paragraph. We will endeavour to do as you suggest; but in papers translated from the French it will not always be possible.

W. H. Fox.—The most likely cause for the appearance is, the employment of alcohol of insufficient strength.

P. S.—We cannot give you more information on the subject than will be found in the papers which appeared in our columns some time since.

Rack and Pinion.—Those combinations of lenses which are intended to be used for both portraits and landscapes (by unscrewing one lens), are not usually so good as those made expressly for one particular purpose. French lenses are not considered so good as English.

W. L. M.—Add solution of chloride of sodium until no more precipitate is formed, then make acid with nitric acid, place in a large bottle, and shake violently for some minutes; this will cause the precipitated chloride of silver to cohere together, and you will not find any difficulty in filtering it.

J. L. Davies.—We recommended the alkaline solution at p. 86 in preference to Bayard's bath; more on account of its not being likely to cause the pictures to fade, than for any other reason. If you cannot succeed well with it, try the plan recommended at pp. 83, 84, and noticed again in the present number. We can speak from experience as to the beauty and permanence of the results. We do not know how Ogle and Edge's prints are toned. They are peculiar, but not such as we should care to imitate.

W. Deane.—The picture you enclosed is very successful. 2. Try 10 grains of protosulphate of iron to the ounce. 3. We are sorry we cannot give you more information on that point than has already appeared.

Colon.—1. We do not think it will; but we have seen very good pictures done by its means. 2. Almost as well. 3. See under the head "Answers to Minor Queries" for an answer to this.

J. Askew.—1. You do not tell us the strength of the silver solution, or what it has been used for before; so we can hardly say how it can be made available for exciting albumenised paper. If it is only nitrate of silver dissolved in water, it will do at once if made of the right strength. If it is a collodion bath, evaporate it down to one-third of its bulk, add a few drops per ounce of acetic acid, and filter. 2. Always tone before fixing. 3. Separate baths should be used.

M. and S.—Send a stamped and addressed envelope, and we will give you the information you require.

K.—1. We have forwarded the desired information per post. 2. A sliding front should be used. 3. The alteration you mention has not been adopted, to our knowledge, by any manufacturer; it would, however, be an improvement. 4. We expect the promised preservative portfolio will be in London shortly. We are much obliged for your other hints and suggestions; and will consider whether they can be carried out.

Yarra Yarra.—Answered in our "Notes and Queries."

Delta.—1. Develop again after fixing the positive. 2. A transparent positive is one copied from a negative, either by superposition or in the camera; in the latter case the camera must be lengthened very considerably, or the positive will be very small in comparison to the negative. 3. We do not know how raspberry syrup is prepared; we think vinegar enters into its composition.

F. Cook.—The camera must on no account be tilted upwards, but must invariably be kept horizontal; if you cannot in this way get the upper part of a house in, raise the lens up by means of the sliding front, for the required distance, and you will find that the building will enter the field, and will not now have the appearance of falling forwards, as has been the case when you tilted the camera upwards.

E. J. L.—We have answered you by post.

An Aspirant.—1. The object glass of a telescope will not do very well, but it will answer your purpose to begin with; place the flat side nearest to the view you intend to take. 2. The calotype process. 3. The first house you have named.

G. Carpenter.—We will try and obtain the desired information.

Midnight Sun.—1. We hope to be able to give you further information soon. 2. The price of the work on colouring photographs, published at the "Photographic News" office, is 2s. 6d., or per post 2s. 8d.

A Subscriber (Cork).—1. The ordinary magic lantern will do. 2. We will see about an article such as you suggest.

D. M. C.—1. *Glacial* acetic acid is meant. 2. Nitrate of potash, and nitrate of potassa, are the same thing. 3. Add a drop of nitric acid to each ounce of developing solution. 4. Perhaps the lens will not cover the corners of your plate. Look on the ground glass and see if the corners are dark. 5. Treat your bath for fogging as recommended in previous numbers. 6. Pretty good: a better one has been given in our columns.

T. T. P. B. Warren.—Take a positive on glass, either by copying a negative in the camera, or by superposition on a dry plate.

Young Beginner.—1. See above. 2. A diaphragm is piece of a metal or card, with an aperture in the middle to place in front of the lens for the purpose of diminishing the aberration of the lens. The apertures in the card vary from ¼-inch to 1 inch, or more, according to the kind of lens used.

Forsyth Sanery.—The receipt for an alabastrine solution which we gave at p. 180 of the "Photographic News," will not give a blue picture but a clear white one; there must be something wrong with your solution.

G. E.—Slight chippings at the edge of your lens will not produce any prejudicial effect, unless they are sufficiently large to reflect light injuriously into the camera; in this case, they may be blackened over with black varnish.

R. J. J. Brown.—An old nitrate bath evaporated down will not give nitrate of silver in anything like a pure state; it will be very much contaminated with organic matter. For a method of recovering the silver from an old bath, see to-day's "Chemistry," p. 293.

Communications declined with thanks:—F. W. X.—A. R.—An old hand—Crow—Q. A.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—January.—H. Ferrant.—H. B. Y.—A Beginner—Peter—A—S. T. R.—A Stranger—Old Hypo.—Tomkins—X. Y. Z.—A Subscriber.

In Type:—A. B.—S. T.—A London Firm—J. B. R.—J. W. W.—W. W.—Chemicus W. W.

Erratum.—Page 272, line 11, for "mechanical diversion," read, "mechanical division."

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. I., No. 26.—*March* 4, 1859.

PHOTOGRAPHS IN THE DARK.

OBSERVATIONS ON M. NIÈPCE'S DISCOVERY OF "A NEW ACTION OF LIGHT."

IN giving a description of M. Nièpce's method of obtaining photographs by means of light stored up in hermetically sealed tubes, we expressed a doubt whether light was in reality the cause of the effect described, and further consideration led us to doubt still more. It appeared to us more reasonable to attribute the phenomenon of the production of a photograph in the dark to chemical agency, but our respect for M. Nièpce's ability prevented us from stating this publicly; but, inasmuch as he has now discovered that photographs may be produced by the action of radiant heat, we think we are justified in expressing our opinion that this heat, combined it may be with a chemical reaction between the bodies in the tin tube, is the actual producing cause of the effect he has described. As a proof of this, we will detail an experiment we have recently made:—We dissolved half an ounce of crystallised tartaric acid in about two ounces of water; in this we soaked some sheets of thick English paper. When the solution was well absorbed, the sheets were taken out and hung up to dry. A common tinned iron canister, about eight inches long and three wide, with a lid, was well cleaned inside, and when the sheets of paper were nearly dry, the inside of the tube was lined twice with the paper. We now followed the directions of M. Nièpce, as given in our last number, p. 291. A little water was introduced inside the tube, so as to well moisten the paper, and the excess poured out. The tube was again closed, and heated to a temperature too high to be borne by the naked hand. It was then opened directly, and applied face downwards upon a sheet of ordinary sensitive chloride of silver paper,—a piece of a handbill having previously been laid on to serve as a negative. It was suffered to remain in that position about ten minutes. The result was precisely similar to that described in our last number but one as having been accomplished by M. Nièpce in the presence of Professor Wheatstone. The circle of the sensitive paper which was covered by the mouth of the tube became visibly blackened in those parts which were unprotected by the piece of handbill, the letters on which were impressed white on a black ground, and distinctly legible. This, therefore, proves conclusively that light has nothing whatever to do with the operation, inasmuch as the *whole* of the manipulations we have described were performed at night by the light of a small lamp. The whole of the materials employed had also been kept in darkness for some time previously.

These experiments have been tried too recently for us to venture to state more than the simple fact. We have, however, clearly shown that the experiment upon which M. Nièpce chiefly bases the theory of the preservation of light, will succeed perfectly under conditions where no light has been previously absorbed; and thus it is but natural to conclude that some of the other extraordinary results obtained by that distinguished physicist may possibly admit of a less improbable explanation than one which demands the existence of a new and almost inconceivable property in sun-light.

NEW GOLD-TONING PROCESS.

THE following is the process which Mr. Maxwell Lyte sent to the last meeting of the French Photographic Society.

. . . . This process is equally good for every kind of paper, albumenised or simply salted. Its colouring properties are remarkable, especially when used for proofs on albumenised paper, which often fail with the ordinary processes of colouring employed.

The process is as follows:—Sensitise the paper as usual on a nitrate of silver bath, at 20 per cent., and print in the ordinary way; only, it is better to overprint it a little. Then place the proof in a dish of water in order to free it from the greater part of its nitrate; put it, afterwards, in a dish of salted water, and leave it there from five to ten minutes. The object of this bath is, to convert every trace of free nitrate that might have been left in it by the first bath into chloride. This bath is essential to prevent the decomposition of the following bath, in which the proof is to be next placed. This bath is composed as follows:—

Sesquichloride of gold	15 grains.
Phosphate of soda (the purified tribasic phosphate of commerce)	300 grains.
Distilled water	1¼ pints.

N.B. This bath ought to be completely neutral, or, at all events, rather alkaline than acid. If it should be acid, it is a sign that the chloride of gold was not properly prepared.

As soon as placed in this bath, the tone of the proof begins to change, and passes rapidly from red to purple, violet, and black; at the same time, the solarised parts of the proof lose their dead tone, and all their details are developed in an astonishing manner.

The colouring may be arrested at any moment. If it be stopped at the purple tone, the proof will appear sepia after the operation, if stopped at the black tone, it is rather black or grey. After this bath, the proof is put in a new hyposulphite of soda bath, of 20 per cent., in which a little Spanish white has been put in suspension, and finished as usual.

These proofs are so stable that they resist the action of a cyanide of potassium bath for a very long time.

The great advantages of this process are—1. The colouring bath is perfectly neutral, and cannot produce any decomposition in the hyposulphite of soda; 2. The colour is entirely produced by the gold, which has hitherto been considered the most certain means of colouring, since the proof is not in contact with the hyposulphite until after it has received its colour. Finally, there does not exist in the bath any organic acid to determine its spontaneous decomposition, and the precipitation of the gold in a metallic state.

The colouring bath described above may be prepared beforehand, it does not decompose by keeping if care be taken that none of that used is returned to the bottle. It is likewise very economical, since with 15 grains of chloride of gold, sixty or seventy pictures, 24 × 30, may be coloured. In order to make sure that no traces of gold that may be left in the bath after use shall be lost, the remains of these baths should be poured into a bottle containing some bits of copper.

180 grains of borax may be substituted for phosphate of soda with a like result.

The proofs sent by Mr. M. Lyte, with his communication, were pronounced to be equal in brilliancy and colouring to those obtained by the process of toning with alkaline salts of gold.

Critical Notices.

The Principles and Practice of Harmonious Colouring, especially as applied to Photographs. By an Artist-Photographer. London: Cassell, Petter, and Galpin, "Photographic News" Office; and Newman, Soho-square.

Whatever may be the ultimate destiny of photography, it appears tolerably certain that, for the present at least, portraiture must claim the largest share of attention amongst professional operators. It is scarcely less certain, that in the majority of hands, and to meet the majority of tastes, colour as well as form is necessary to the production of satisfactory likenesses. Such being the case, it is somewhat singular that whilst elementary treatises on photography have issued from the press in such profusion as to produce something of an *embarras de richesse* anything like a comprehensive and intelligent work on the application of colour to photographs has not until now appeared. With the exception of a little book we noticed some time ago on "Painting Photographs," and in which the photograph is chiefly regarded as the basis of a painting, this is, we believe, the first distinct treatise on the subject.

One of the first facts which strike us on perusing the work is the absence of that misappreciation of photography which has been too common amongst painters. The author is manifestly as familiar with the mysteries of the "dark room" and the capabilities of the camera as with the palette and pencil, and very willingly regards photography as something more than a "servant of servants." Notwithstanding this, he is keenly alive to the defects, not so much of photography, but of photographers; and in an introductory chapter, which we commend to the attention of our readers, speaks with unmeasured censure of the vulgarity which has unfortunately characterised a large portion of photographic portraiture. The remedy for this, he suggests, is a higher state of artistic culture amongst photographers. On this subject the following remarks are to the point:—

"A cardinal blunder with photographers has been the supposition that a good photograph must necessarily be a perfect representation of nature, and that such an imitation of nature as the photograph presented must be the highest triumph of art. Passing by, for the present, the first assumption, or, for the moment, for argument's sake, admitting it to be true, we must submit that nature has many aspects, but not all equally beautiful. As regards portraiture, the living model is seen in ever-shifting positions, and ever-varying aspects of light and shade, very few of which, however, it may be, would be suitable for portraiture, notwithstanding that they are all natural. That a portrait should be what some call natural does not, therefore, by any means imply that it is perfect as a picture. It may be natural that a person should at some time wink, smirk, or frown, that he should occasionally stoop, loll, or stretch himself; but no one would for a moment dream of perpetuating these actions in a portrait. Notwithstanding, we have seen many photographic portraits in positions little better. Sitters placed upon a chair bolt upright, with head, body, and limbs in one line, a hand thrust forward sprawling on each knee, all arranged with such accuracy that if the figure were cleft down the middle, the halves would weigh the same to a fraction! The expression accompanying this position being generally either one of the most listless fatuity, or, with every muscle on the strain, the eyes glaring, and the features contracted to a most diabolical frown, the idea is conveyed that the sitter is just gathering his energies for a fatal spring upon some victim. Others, again, carefully avoiding these enormities in arranging the sitter, affect positions of unstudied ease and carelessness, in which, however, everything like grace or dignity is alike wanting.

"The photographer must not only give up his favourite notion that he has only to depict nature to succeed, but also that the most perfect photograph is necessarily an accurate reproduction of nature as she is seen. The best product of the camera, unaided by art, is often very far indeed from being a transcript of nature. The principles of photography, both chemical and optical, combine to render this inevitable. The intense photogenic action of some colours, and the almost entire absence of such action in others, chemically, and the necessary undue enlargement of advancing objects and diminution of retiring ones, mechanically, combine to remove the photograph as far from nature as many imagine the painting to be; the difference being, that whilst it is the province of art to soften peculiarities, photography very often exaggerates them. The incipient wrinkle or trifling scar, which in nature is, it may be, hid by the brilliancy of complexion; the slight freckle, which to the eye varies so little from the general tint of the skin as scarcely to excite observation, are at once searched out by the one huge cyclopean eye of the camera, and rendered with uncompromising distinctness in black and white. The red or golden tresses appear with raven blackness, whilst the blue eye, which in the photograph is as colourless as water, seems to have lost in depth of colour what the hair has gained. The most enthusiastic photographer has often felt his failure here, and has here acknowledged that the aid of art, in colouring, is pre-eminently needed.

"In thus referring to the defects of photographic pictures, we must not be understood to depreciate photography. We simply insist on the necessity of the artistic element in applying it. We deny entirely that photographic portraits *necessarily* represent the sitter as having just gazed on the Gorgon's head. Let the photographic operator, whilst availing himself of every improvement in manipulation, acquaint himself with the laws by which the painter secures the semblance of nature; let him learn how to arrange his subject, and choose his point of view; how to secure a proper balance of light and shade: in short, how to produce a *picture* instead of a mere diagram. Let him remember, also, that although many of his sitters may be disposed to use the words of Oliver Cromwell—'Paint me as I am, warts, and wrinkles, and all'—that no one will wish the warts to appear as wens, nor the wrinkles as seams and scars. Let him study the productions of the great masters in painting, both for position, drapery, disposition of light and shade, and colouring. A portrait secured under the best conditions of photography, guided by art, will be worthy of the best efforts of the colorist, and may, in his hands, fairly rival the finest miniature painting."

Of the practical portions of the book, an important feature is the chapter on the application of powder colours to positives on glass and paper. It is, we have no hesitation in saying, the most complete, if not the first complete, chapter of instructions on this subject ever published. Of course, we except in this remark our own "Lessons," and it may be important and interesting to our readers to know on this subject that the instructions of the writer in no wise clash with those in our columns, and that the same numbering and classification of colours appears to have been adopted as those referred to in our "Lessons," so that the student of both courses of instruction will not be led into any confusion in this respect. It is scarcely saying too much to observe that the careful study of our "Lessons" and of the work before us can leave little to be desired in this department, and, so far as knowledge can aid him, the photographer will be in a position to achieve all that can be effected by photographic colours.

The chapters on water and oil colouring, and their especial adaptation to photographs, are equally good. The remarks on the selection and preparation of photographs for the especial treatment intended will prove highly interesting and valuable to photographers, as will also the practical hints on the modes of remedying defects, varnishing, &c.

An important feature of the book is an interesting chapter on the harmony of colours, with coloured diagram illustrating the relations of the primary, secondary, and tertiary colours. The artistic portion of the book is guaranteed by the name of one of the oldest and most respectable houses connected with art and the supply of art requisites, and will, we doubt not, fully sustain their reputation. Altogether, it is a book which should be in the hands of every photographer, as it cannot be read without interest, nor studied without profit.

Lessons on Colouring Photographs.

RELATIONS AND HARMONY OF COLOURS—(*continued.*)

We shall conclude our brief statement of the principles on which harmonious colouring is based by a few remarks on their application to portraiture, following to some extent, on this part of the subject, the authority of M. Chevreul, whose work on the harmony and contrast of colours, and their application to the arts, is perhaps the most complete and conclusive ever published.

Notwithstanding the almost infinite gradation and variation of complexion amongst the Caucasian or white race, it may be, and generally is, divided into two well marked types, the blonde, or fair complexions, and the brunette, or dark complexions.

In the first type, the blonde complexions, the harmonies of analogy chiefly prevail. The colour of light hair, being essentially the result of a mixture of red, yellow, and brown, is regarded as a pale orange brown; and the colour of the skin is analogous to it in generally being a very dilute or pale tint of the same colour. The roseate tints of such complexions, although entering into another scale of colour, forms no contrast, but generally preserves the analogy of hue. The blue eyes most common in such complexions are the only points giving rise to the harmony of contrast.

In the brunette type, on the contrary, the harmonies of contrast predominate. The hair, eyebrows, eyes, &c., contrast in tone and colour "not only with the white of the skin but also with the red parts, which in this type are redder, or less rosy, than in the blonde type." This classification can of course only be regarded as existing in an absolute degree where the types are strongly marked, and is so far generally suggestive.

In regard to the effect of draperies on complexion, especially when in immediate contact, the following suggestions will be found worthy of remembrance:—Rose red cannot be put in contact with the rosiest complexions without detracting from their freshness, unless it be kept decidedly lower in tone. Dark red is in many cases less objectionable, as from its depth it tends by contrast of tone to impart whiteness.

A pure, delicate green is, on the contrary, favourable to fair complexions, especially if they are at all deficient in colouring. Where the carnations are, however, decidedly red, or are much inclined to orange, a delicate green is less suitable, whilst deep green will give them value from contrast of both tone and hue.

Yellow drapery, as is well known, is favourable to a brunette, as it tends to neutralise the yellow in the complexion. To fair complexions it is, however, often ruinous, imparting to them, as it does, something of its complementary, purple.

Violet is rarely favourable to any complexion, as no complexion is improved by receiving an accession of its complementary, yellow. It has the effect on fair complexions of imparting a sickly greenish yellow, and, on dark complexions, of making them appear affected with jaundice. The only case in which it is admissible is when, by extreme depth, it imparts whiteness by contrast of the tone.

Blue, as is well known, is suitable to most fair complexions, affording, as it does, a complementary contrast to the general hue of the complexion. The only fair complexions in which it should be avoided are those accompanied by red hair, in which case the orange tint of the hair would be augmented, an effect rarely to be desired. Blue rarely suits the brunette complexion, which is not often improved by receiving any accession of orange.

Orange drapery is rarely suitable, as it is too glaring and brilliant in itself, and no complexion is improved by looking blue—an effect which the proximity of orange is calculated to produce.

Pure white improves a fresh, rosy complexion, but to complexions wanting in freshness, whether belonging to the blonde or brunette type, it is injurious. The whites, however, of light open white draperies, such as net, tulle, lace, &c., have the effect of grey, and improve most complexions.

Black draperies will, in most cases, tend to whiten the effect of the skin, but where there is a prevalence of dark red in the complexion it is unfavourable, as the red is heightened and appears less roseate.

The application of the principles we have briefly indicated must rest with the artist, and will call for the constant exercise of careful observation, study, and judgment; for, as M. Chevreul remarks, "the varieties which exist between the two extreme types of complexion, and which unite them by insensible shades, are the reasons why the artist only can estimate the harmony most suitable to such of the varieties as he is employing for a model; consequently it is for him to judge if the dominant tint of a complexion must be exalted or diminished, either integrally, or in one of its elementary colours, or whether it must be altogether neutralised; it is for him to see, in the case where he wishes to weaken it, if this is best done by means of a drapery of a darker tone, and thus to form a harmony of contrast of scale or hue, or else, if, on the contrary, it is preferable to attain the same end by opposing to this tint a drapery of its complementary colour, taken at a sufficiently high tone to produce the double effect of weakening by contrast of tone, and at the same time of producing a contrast of colour with that portion of the tint which is not neutralised."

(To be continued.)

A Catechism of Photography.

ALBUMEN PROCESS.

Q. Has the albumen process been long known to photographers?

A. It has, having been used many years before the introduction of the collodion.

Q. By whom was the process invented?

A. Sir John Herschel in England, and M. Nièpce de St. Victor in France, who exhibited the first negatives obtained on glass by means of albumen.

Q. Is it a difficult process?

A. No, the plan is simple enough, but requires considerable care in manipulation.

Q. Is it a successful process?

A. Yes; it rivals the daguerreotype in sharpness of definition.

Q. Is it more or less sensitive than the collodion?

A. It is less sensitive than the collodion, requiring an exposure of minutes where the collodion demands seconds. It surpasses collodion, however, in its capability of rendering depth and transparency of shadow, with extreme brilliancy in the high lights.

Q. What is albumen?

A. White of egg. Albumen is the true starting point from which all tissues are formed, as the egg contains no other nitrogenous compound except albumen; the yolk containing, besides albumen, a yellow fat only.

Q. What is the chief characteristic of albumen?

A. Its coagulability by heat.

Q. How is soluble albumen obtained?

A. It may be obtained in a soluble form by evaporating at a temperature below 120°. It is then a dry, horny, brittle mass of a yellowish colour, tasteless, and without odour. It is insoluble in alcohol and ether, but soluble in water containing alkaline salt or chloride of sodium. It is an important fact that albumen cannot exist in the soluble state in the absence of mineral constituents, and that a slight alkaline reaction is the best condition for photographic operation.

Q. What albumen is best adapted for photographic purposes?

A. That of the hen's egg. The eggs should be perfectly fresh, and not more than four or five days old.

Q. How is the albumen to be obtained from them?

A. By breaking each egg separately into a shallow dish, and retaining the yolk and germ in the shell.

CLEANING THE GLASS.

Q. What sort of glass is the best adapted for this purpose?

A. New patent plate glass.

Q. How should the glass be cleaned?

A. By fixing it firmly in a wooden screw or vice, perfectly flat, and rubbing it with a pellet of cotton wool dipped in a solution of alcohol, ammonia, water, and tripoli,

Q. In what proportion should these ingredients be mixed?

A. As follows:—

Alcohol	1	ounce.
Strong liquid ammonia	$\frac{1}{4}$	"
Water	$1\frac{1}{2}$	"
Tripoli	1	"

Q. How do you proceed with the cleaning process?

A. As soon as the plates have been thoroughly rubbed over with the solution, they should be allowed partially to dry, then rubbed off with a clean piece of wool, and, finally, polished with another pellet of the same material. The back and edges should be dusted with a hog's hair brush, and the plates then put away in a dry clean box.

ALBUMENISING THE GLASS.

Q. How should the albumen be prepared?

A. In the following manner:—

Albumen	12	ounces.
Saturated solution iodide of potassium ..	$\frac{1}{4}$	"
Bromide of potassium	23	grains.
Water	15	"
Solution of caustic potash	1	drop.

These ingredients, having been put together in a large bottle, should be thoroughly shaken up until the bottle is quite filled with white foam. The solution should then be allowed to stand for five or six hours in a cool place. One hour before the solution is to be used, it should be decanted into a glass measure.

Q. How is it to be spread over the glass?

A. The glass should be taken on the tips of the fingers of the left hand, and the albumen poured on to the surface in a sufficient quantity to cover the plate; the excess must be poured off into the measure. It is best to prepare a number of plates at once; four dozen can easily be coated in an hour; each plate takes a considerable time to dry; and, thus albumenised, will keep for any length of time.

(*To be continued.*)

Photographic Societies.

London Photographic Society.

After the names of the members of the Society who had been elected at the last meeting had been read, the Secretary proceeded to read the minutes, a reference in which to the accounts having been received and adopted brought Mr. Bishop on his legs, to give formal notice of a resolution he proposed to move at the next meeting. His resolution was to the effect, that, to better enable the members of the Society to understand their financial position, a detailed statement of the accounts for 1858 should be forwarded to each member of the Society, and the same plan be continued in all subsequent years, one week previous to the annual meeting of the Society. The Chairman expressed his opinion, that no member was entitled to give such a notice except at the annual general meeting.

Mr. Bishop then urged that the President had laid it down, that it was competent to any member to give notice at any *one* meeting, that he would move a certain resolution at the *following* one.

The Chairman, having consulted a copy of the Rules, reasserted his opinion, that no such resolution as that proposed was admissible, but expressed his opinion that the council would be happy to consider the resolution he proposed, and to give him any information in their power.

Mr. Bishop placed a copy of his resolution in the hands of the Chairman, and the matter was allowed to drop.

Major Cooper was then requested by the Chairman to read a paper he had prepared on the subject of positive printing by a new process. The reader admitted that he had not had time to consider his process thoroughly, and that he had no doubt some of the members of the Society might improve it. It is not necessary that we should give a detailed report of his process, as it is by no means so new as the Major imagines. It consists in steeping good thin paper in a solution of bi-carbonate of potass (60 grains to 2 ounces of water), and then floating it on the silver bath, the result of this being the formation of a sensitive surface of carbonate of silver, instead of the ordinary one of chloride of silver. The fixing was then accomplished by means of malic acid; thus obviating the use of hyposulphite of soda, the malate of silver being dissolved away by means of distilled water.

Mr. Hardwich pointed out sundry objections to the adoption of Major Cooper's process, and supported his objections by results he had arrived at in various experiments he had made.

Mr. Shadbolt rose for the double purpose of correcting Mr. Hardwich, and enlightening Major Cooper on certain points of chemistry; of which—

Major Cooper, in his reply, showed that he was in no need.

The Secretary then read a communication from Mr. Hardwich, proposing that a committee should be selected from among the members of the Society, to examine and pronounce upon the merits of his collodion. He was prepared to give them the fullest information on the subject.

A letter from a correspondent was then read, referring to Mr. Pouncey's carbon process (which, by the way, we may mention, is asserted not to be Pouncey's at all), but it was read in so low a tone that it was impossible to hear more than a few dislocated sentences at a short distance from the table. We believe, however, that the writer said he had tried the carbon process claimed by Mr. Pouncey, and had not succeeded in obtaining good results.

A member rose and stated that he had tried it, and wholly failed.

Mr. Shadbolt rose to offer some remarks on Mr. Hardwich's proposition; the drift of which was, that the committee should examine and report on the comparative merits of all other collodions that might be submitted to their examination by other makers as well as by Mr. Hardwich.

Mr Sebastian Davis stated, that he had tried the formula given by Mr. Hardwich for manufacturing pyroxiline, and had not succeeded in obtaining a satisfactory result.

Mr. Hardwich, in reply, gave several reasons why this might happen; and then, referring to the proposition he had submitted to the council, he admitted that he had not suggested that the committee should examine any other collodion than his own, and that in doing this he had been guilty of no objectionable proceeding. He had been induced to adopt a certain formula for manufacturing that substance, from having found by experiment that it was the best that could be devised. He had received communications on the subject of collodion from India, Australia, and every other part of the British Dominions, where the greatest diversities of temperature prevailed, and he had been influenced in his experiments by these communications. He thought that, after the labour he had bestowed on these experiments during the last two years, he was perfectly entitled to make the proposition he had submitted to the council.

The Chairman stated that the council had adopted Mr. Hardwich's proposal to a certain extent. They proposed to select a committee to test the merits of that gentleman's collodion, and at the same time to test the merits of collodion produced by other manufacturers.

Mr. Hughes rose to offer some observations in support of Mr. Hardwich, and referred to the "immense accumulated mass of information" possessed by him on the subject of collodion; but his remarks appeared to be based on a misconception of what had passed.

Mr. Hardwich said he had no objection whatever to the determination arrived at by the council; but at the same time, he did not consider that there was any reason why he should have made his proposition in any other form than that he had adopted, and that he certainly had not proposed that the committee should examine and report on the comparative merits of all kinds of collodion; and expressed his apprehension that the committee would have more to do than they could successfully accomplish.

The Chairman said the council had not had time to proceed any further in the matter, but they would consider it in the interval between this and the next meeting.

He then went on to say that the exhibition would close tomorrow (Wednesday); that her Majesty and the Prince Consort visited the exhibition a few days ago, and that her Majesty had been graciously pleased to express her approbation generally of the photographs exhibited; that the Prince

Consort had suggested that the Society should form a collection of all the photographs they could get, printed as far back as it was possible to obtain them, and to continue the same system for the future. He appealed to the members to contribute to carry out the idea.

A vote of thanks was then proposed by the Chairman to Major Cooper; a proposition which was received with the usual pedal demonstration, presumed to signify that the motion is carried unanimously.

The major politely bowed his acknowledgments.

The Chairman then pronounced the meeting adjourned until the first Tuesday in next month.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

At an ordinary meeting of this Society, held February 21, 1859, at the Golf Club House, the President, J. Glaisher, Esq., in the chair, the minutes of the last meeting were read and confirmed.

The President called the attention of members to the proposed *soirée*, which it was in contemplation to hold at the Mansion House, London, subject to the acquiescence and approbation of the Lord Mayor.

It was moved by Mr. Harding, and seconded by Mr. Knill, "that such *soirée* be held."

It was proposed by Mr. Wood, and seconded by Mr. Ledger, "that a Committee be appointed to promote the matter, and report progress at the next general meeting, consisting of the following gentlemen, viz.:—The President, Vice-President, Treasurer, and Secretaries *ex officio*, Messrs. Benneck and Wood."

The President then proceeded to read a letter from F. Haes, Esq., dated Sydney, relative to the deterioration of some dry collodion plates, dimness commencing at the margin and spreading about three-eighths of an inch inwards.

The President likewise exhibited some beautiful photographs of Linton and the North of Devon.

Mr. Wood, several from the south of France.

Mr. Knill, some fac-similes of frescoes from the Campo Santo, Pisa.

William Porter Knightley, Esq., was balloted for and duly elected a member of the society.

The meeting then adjourned.

Photographic Notes and Queries.

THE COLLODIO-ALBUMEN PROCESS.

Sir,—Referring to your notice of Mr. Warner's photographs in a recent number of the "News," and to the remarks at the end of your review, would Mr. Woodward, of Nottingham, favour us with information such as Mr. Warner has given, respecting his beautiful slide called "Wilford." The process, I believe, by which it was taken is the collodio-albumen, but information as to the exact manipulation, the time of exposure and development, and, above all, the kind of lens used, would be invaluable,—Mr. Woodward's slide being undoubtedly *one* of the best (if not the best) yet out in point of manipulation.

The deep shadows under the trees, so perfectly shown, proves that his lens must be first-rate. J. W. W.

THE COLLODIO-ALBUMEN PROCESS.

Sir,—In reply to your correspondent "J. W. W.," I beg to supply the following particulars respecting the stereogram "View in Wilford," which obtained the prize awarded by the Nottingham Photographic Society.

The process I use, not being a "new" one, is probably not fashionable just now; "old" processes are tabooed, and nothing goes down now if it is not a "new (?) discovery;" consequently we are inundated with these precious "discoveries," *ad nauseam*, from "raspberry jam" down to "gin-and-water," which latter, I firmly believe, would produce as good negatives, as many of these so-called *discoveries*.

My process is the old collodio-albumen, and I would refer your correspondent to an excellent paper by Mr. Sidebotham, which appeared in the "News" a few weeks since: the manipulation there described being exactly that which I practise. There is a slight difference in the preparation of the albumen, I believe; Mr. S. using iodide of potassium, whereas I use iodide of ammonium, which I believe is the more sensitive: I do not state this positively, however, having never used the potassium salt in the preparation of albumen. I speak from analogous experience in the use of the two salts in other departments of photography.

The exposure of the "View in Wilford" was two minutes, bright sun on the 13th September last, one of the last days of summer, and a more splendid "photographic" day I never witnessed.

I develop with one grain of pyrogallic to the ounce, with one drachm of *Beaufoy's* acid in hot weather, and half a drachm in cold, and use a stereoscopic lens—4½ inches focus.

I may as well add, that my experience has taught me the true secret in the production of good negatives, viz.—*development;* many a plate is spoilt in this part of the manipulation by the too free use of pyrogallic, and, *above all*, of silver. Amateurs generally (of course, beginners) are too impatient to see their picture; if it does not appear in two or three minutes, more and more silver is added, to the utter destruction of the negative. I am well content if my plate is fully developed in half or three quarters of an hour. Pictures, with bright sun, are of course developed in less time; most patience is required with those exposed in dull light.

I inclose for your inspection a stereogram "In Burghley Park," Stamford, in which you will observe the details in the deep shade are observable in a more marked degree than in the "View in Wilford;" the grass, &c., under the tree on the right of the picture, were in shade as deep as night, for the day was exceedingly dull and dark, in October last; the exposure for this was seven minutes. You will observe the great latitude of exposure the process allows (I have good negatives with twelve minutes' exposure) without injury to the high lights, which is, I think, its chief and most valuable quality.

I shall be glad to supply any of your readers with such further information as I am enabled to give.

Long Row, Nottingham. Wm. Woodward.

PORTABLE DEVELOPING BOX.

Sir,—I send you a description of a developing box. It is made with ½-inch wood; size—outside measure, 18 inches long; 13½ inches deep; 12½ inches broad. In this I can pack everything except the legs of the camera, *i.e.*, camera, glasses, dishes, chemicals, indeed, every requisite for the wet process, and in sufficient quantity to keep me working for a month. A Working Man.

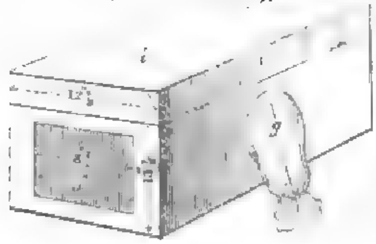


Fig. 1.

i is a shade to keep the light from the eyes: made of thin millboard, and covered with calico; the sides fold in when not in use, as in fig. 1.

k is an elastic band to keep *i* down when not in use, and to keep it steady when in use.

l is a yellow glass window, 4 × 2 inches, for looking in at; fig. 3.

a is the place for the silver bath; if required for a large size a hole might be cut out to let the bath fall into; fig. 2.

b is for the fixing bath, *c* for the developing solution, and *d* for a bottle of water; fig. 2.

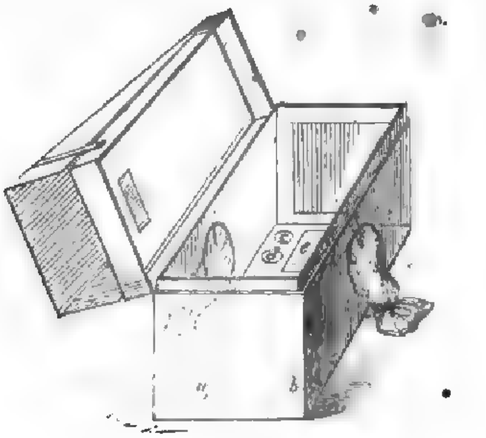


FIG. 2.

e is a dish for the waste water and developer; fig. 2.

f is a yellow glass window, $8\frac{1}{4} \times 7\frac{3}{4}$ inches, for admitting light, with a sliding shutter to protect the glass when not in use; fig. 1.

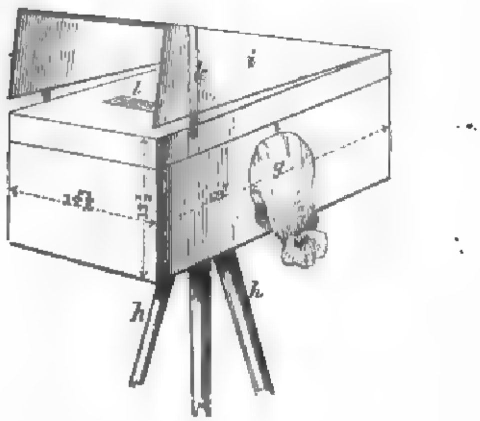


FIG. 3.

g.g are black sleeves with elastic bands; the hole is $5\frac{1}{2}$ inches diameter; figs. 1 and 3.

At *h* may be any convenient stand; fig. 3.

A bottle of water may be suspended outside at one of the further corners.

PRESERVING SENSITIVE PAPERS.

SIR,—It may be of interest to some of your readers to know that they may always keep a stock of ready sensitised albumenised paper on hand, in a wide-mouthed stoppered bottle, which must be kept in a cold, dark place. The paper will then remain unaltered for weeks after it has been made sensitive.

Would you, or one of your numerous correspondents, be kind enough to give a formula for making penetrating varnish? JOS. B. ROBINSON.

ANSWERS TO MINOR QUERIES.

DILUTE ACIDS.—*R. O. F. S.* When the term *dilute* is applied to acids, it is understood that the *exact* strength is immaterial. In all such cases it will be quite correct to use a mixture of 1 part strong acid and 5 parts water.

CHLORIDE OF LIME.—*K. B. B.* is astonished to see in a respectable contemporary the startling assertion, that "the substance known by the name of *chloride of lime* is simply lime impregnated mechanically with chlorine gas." This must have been written thoughtlessly, for we cannot believe that the writer has really so limited a knowledge of chemistry as to be ignorant of the chemical composition of commercial chloride of lime. It is a mixture of hypochlorite of lime Ca O. Cl O, with chloride of calcium Ca Cl. It is prepared by saturating well slaked lime with chlorine gas, and avoiding rise of temperature. The reaction of its formation may be expressed symbolically 2 Ca O + 2 Cl = Ca Cl + Ca O, Cl O. It is a white [illegible]t-looking powder, which must be preserved in well closed v[illegible], kept cool, and away from the light. It always smells slightly of hypochlorous acid.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. COWSS B.—A toning bath is not safe to use if it deposits much black sulphide of silver, as the pictures toned in it will be liable to fade; always have your solutions clear.

UNCLE TOM will observe that we only [illegible] the "[illegible]" plan on the authority of *La Patrie;* we ourselves have been no more successful than our black-fingered friends.

T.—We will examine the sample of paper sent, and reserve our correspondent's letter till a future occasion.

C. BATES.—We do not at present know what the duty will be; but will inquire. The postage of each copy of the "PHOTOGRAPHIC NEWS" to Forest City, 300 miles from San Francisco, will be 2d.

Φῶτος.—We are as anxious as our correspondent can be to hear more particulars about Major Fitz-Maurice's new light.

ALPHA.—Very possibly your bath is too acid; that would be more likely than the collodion to produce the defect you name.

F. S. W.—Although at first sight the yellow colour of gold articles might make a photographer fearful of obtaining good pictures of them, it will be found in practice that there are quite sufficient actinic rays reflected along with the yellow to produce strong action.

F. WILLIAMS.—1. See answer to Φῶτος. 2. Add more silver to your bath.

C. A. BOWDLER.—Try the protonitrate of iron developer, as given at p. 288. Protosulphate of iron will not give intensity in negatives.

ONE IN THE NORTH.—1. You cannot buy the calico ready prepared with wax; but it will be very easy to prepare it yourself. 2. The proposed instrument is impossible to be made. Both eyes are necessary for the stereoscopic effect. 3. A photographic colour maker would be your best guide in this particular.

J. B. W.—The fixing solution was not properly washed off the negatives; we do not think there is now a remedy for them.

W. E. K. informs us that the form of tent suggested by Mr. [illegible]yman is almost identical with one which he planned and had constructed some time since. Possibly this may be the case, but we cannot open our columns to barren disputes as to priority of invention in such trivial matters; priority of publication is in all cases held to decide priority of invention.

L. L. B.—We could better judge were we to see some of our correspondent's pictures

TRANSPARENT.—We do not know what is the exact point claimed by Mr. Glover in his patent for the "transparent enamel photographs." Indeed we do not see how such a thing could be the subject of a valid patent.

J. W. W.—We are obliged for the explanation, and will forward the suggestions to the person named in the letter.

R. L. JONES.—We will at once try to obtain the information required by our correspondent.

CLAPHAM.—If your spent developing solutions are all poured into a large jug and allowed to settle, the deposit will be metallic silver.

MICROPHOTOGRAPH.—See pages 132 and 262 for an account of what you require.

J. RAWLINSON.—Thin French photographic paper.

H. S. L.—Your inclosure was received safely. 1. *All* compounds of silver present will be converted into sulphide by the liver of sulphur. 2. It will be advisable to add an excess of the liver of sulphur. Allow it to stand, draw off a little of the clear liquid, and then see if further precipitation takes place on adding more of the sulphide. 3. No; it is entirely destroyed. 4. Answered in the next number of the "PHOTOGRAPHIC NEWS." 5. See last number, and answer to Φῶτος in the present number. 6. The price of each part of the work is only 1*s*. We will see if we can adopt your suggestions in future. There are, however, objections to such a plan.

J. ATKINSON.—If some dealer in photographic chemicals and apparatus would only undertake to supply gelatine paper at a moderate price, we could point out many important uses for it. We have found it a most valuable material for removing the collodion picture from the glass plate, if a piece of it be laid, wet, on to the wet surface of the collodion picture, and then reared up to dry; the gelatine paper will easily separate from the glass, bringing with it the collodion picture, which will now be found to require no varnishing or any protection whatever, but may be used for printing from as well as if it were the original glass picture.

A NOVICE.—Your picture arrived completely smashed, owing to its having been insufficiently protected.

G. TEAR.—A good plan was given in our last number.

BENGALEE.—1 and 2. About 30 sheets, and then make fresh baths. 3. Not brushed but floated on.

RECEIVED.—D.—R. Harrington.—A Pupil of the "PHOTOGRAPHIC NEWS."—Γ. Δ.—H. Bellini.—A. W.—W. Cochran.—H. C.—Emma.—J. A. L.—L. Smith.—A Novice.—X.—P. Q. R.—Hypo.

[Want of space compels us to defer the remainder of our answers to correspondents, together with our Dictionary and Chemistry of Photography, and correspondence till our next number.—ED.]

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

INDEX.

N.B.—A dash rule represents the *italics* immediately preceding it.

END OF VOLUME I.

LONDON: PETTER AND GALPIN, BELLE SAUVAGE PRINTING WORKS, LUDGATE HILL, E.C.

THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

EDITED BY

WILLIAM CROOKES, F.C.S.

VOLUME II.

"Nulla recordanti lux est ingrata."—MARTIAL.

LONDON:
CASSELL, PETTER, AND GALPIN, LA BELLE SAUVAGE YARD,
LUDGATE HILL, E.C.

1859.

LONDON:
PETTER AND GALPIN, BELLE SAUVAGE PRINTING WORKS,
LUDGATE HILL, E.C.

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 27.—*March* 11, 1859.

It is with no small amount of pride and gratification that we now address our readers in the first number of our Second Volume. And, in doing so, it is only right that we should return our sincere thanks to those who have so widely supported us. Not only are our thanks due to our regular subscribers, but they are especially due to those gentlemen—ay, and ladies, too, who have favoured us with their thoughts and hints on matters photographic.

When we made our first bow to the public, we felt that the arrangements which we had effected were of a character so unique and complete, that they could not prove otherwise than attractive. In this we were not disappointed. Our experience has only tended to show how correct we were in our conclusions. If an additional proof were wanting of the new and important features introduced into photographic literature by ourselves, we should have but to state that not only have those features been appropriated by others, but, actually, the very plan of our typographical arrangement has been adopted; thus furnishing a striking illustration of the truth of the remark, that "Imitation is the sincerest form of flattery," as well as, in our opinion, the most abject.

We now propose briefly to review the manner in which we have carried out the promises made at the outset. We had early intimated that a most important department of the "NEWS" would be, the "Notes and Queries" on photographic matters. The object we had in view was to furnish to the beginner and amateur help and guidance in the early stages of photographic manipulation, and, at the same time, to make our publication the vehicle of mutual instruction and information between experienced operators. To the learner, no little assistance has, we feel, been rendered. Were proof of this wanted, we could easily fill our pages with letters gratefully and thankfully acknowledging the assistance derived from our pages; while, for a proof of the extent to which the Notes and Queries have been made the medium of an interchange of photographic knowledge, we need only refer our readers to the first volume of the "NEWS." The next feature which we proposed to ourselves at the outset was headed "information, derived from foreign as well as domestic sources, of all discoveries and improvements in photography, optics, photographic chemistry, and other cognate sciences." This department has been of great and important benefit to photographers; as the information which we have gathered from foreign sources has been carefully translated and condensed, so as to enable the reader to see at a glance the progress which our continental neighbours are making: while, if a proof of the importance of the information given on home matters were wanting, we need only refer to the fact, that the last important application of the art by the father of English photography—photoglyphy—was first communicated to the world through the pages of the "NEWS."

The Elementary Lessons in Photography, together with a Dictionary of Photographic Terms, was a want which was at once apparent to us at the commencement of our undertaking, and we feel confident that this department cannot have proved otherwise than highly beneficial, not only to the beginner, but to the amateur. Added to this, the "Lessons on Colouring" seem to have given great satisfaction; not only to the amateur, but to the professional photographer. We are convinced that, ultimately, these lessons will have an important effect on the character and style of the cheaper class of photographs. We need not expatiate on the well-known fact that many photographers who use the art in a professional point of view, are greatly deficient in artistic knowledge, not only in the colouring of their productions, but also in the posing of the figure of the sitter, and in the arrangement of background accessaries. When, then, these lessons are consulted and acted upon, they will do much, ultimately, to raise the character of the cheaper class of portraits; and, at least, impart a degree of artistic elegance to these productions. In the Reviews of Photographic Works, and the Critical Notices of Exhibitions, we have always endeavoured to give a fair, candid, and impartial criticism; never, for a moment, degrading our pages into advertisement sheets, but passing on the productions submitted to us an unbiassed judgment.

Of the manner in which we have endeavoured to carry out another portion of our programme, viz., the Reports and Transactions of English and Foreign Photographic Societies, our readers are the best judges. They are fully acquainted with the difficulties which beset our path, and the narrow-minded and monopolising spirit with which we have had to contend. To these we do not more than incidentally allude, as we are conscious, that by this time our opponents have felt how severely they have been censured, and that ere long the opposition which has, in so undignified a manner, been shown to the "NEWS," will be one of the things of the past. Our one great hope, that the "PHOTOGRAPHIC NEWS" should "become the recognised organ of photography; the guide and instructor of the beginner; the medium of communication and interchange of ideas between advanced students; and the record of all improvements and discoveries which may take place in the art," has been fulfilled in a manner that, in our most sanguine moments, we never dreamt of. We can point, with no little pride, to this fact, that not a week has elapsed since our first appearance in which we have not been quoted, not only in the leading daily journals, but also in our contemporaries who are more especially devoted to literature and science; and many times have we received the compliment of being entitled the "recognised organ of photography."

Notwithstanding the fact that we have greatly exceeded our promises in many instances, we are by no means satisfied with even our present position; we are anxious to be still more useful, and to be the means of greater benefit to our supporters.

ENGLISH PHOTOGRAPHY FROM A SWISS POINT OF VIEW.

The following not altogether unreasonable remonstrance has been addressed by Dr. Kolb, of Geneva, to Mr. Ernest Lacon, the editor of a foreign contemporary :—

" The possession of a robust faith seems absolutely necessary to induce one to adhere to the original collodion process in the face of the numerous modifications which have been, without rhyme or reason, introduced.

" We are a pretty good number of amateur photographers here, who still stick to the old method, and it suits us too; for those among us who, more adventurous, have departed from the good old path to follow the pretended improvements, have very soon returned to the original plan.

" Observe, that I am now speaking only of collodion. Subscribers to your journal from its commencement, we have followed the progress of our art, and have practically appreciated the real discoveries that have been described therein. We include among these the use of albumen in the dry collodion process; but we do not see why—considering the beautiful results obtained by its means, and that eggs may be got everywhere—so many persons should advise the employment of caseine, gelatine, &c. &c.—substances that are much inferior to it, and which, while more difficult to obtain, necessitate complicated manipulations. . . . .

" . . The collodion we use is that iodised with iodide of potassium, which is the only iodide of commerce; it is, relatively much cheaper than any of the others, and, being extensively used in medicine, may be bought at every druggist's in every country—the latter consideration being one that tells greatly in its favour. On a photographic tour in the Alps, Pyrenees, Egypt, or Spain, or in any other out-of-the-way place, if you lose or break a bottle of iodide of cadmium or ammonium, your movement will be suspended until you have been able to get another from some large town, which may occupy some days, while iodide of potassium may be obtained at once and anywhere." (What, even in the Alps or Pyrenees, Doctor?)

" M. l'Abbé Despratz says :—' We will say positively that, with a collodion simply iodised with the iodide of potassium, we may easily attain perfection.' How can we reconcile that with the opinions of our neighbours over the other side of the channel? In a recent number of your journal, Mr. C. says, positively :—' Collodion, containing iodide of potassium, ought not to be used;' and he goes on to propose a formula, in which he substitutes for this common substance, iodides of cadmium, ammonium, and calcium, to which he adds bromide of ammonium; for ordinary ether —so humble a substance that it may be found in any village —he substitutes methylated ether. Finally, in using the dry process, instead of covering his glasses with vulgar albumen, he steeps them with a solution made of nitric acid and Nelson's gelatine, and dries the whole in an oven heated to a temperature of 140°.

" Possibly, after all this, one may get proofs by its means, but I confess that it is both expensive and impracticable in travelling. A man could hardly drag an oven about with him! You may say there are bakers everywhere! But a baker's oven is not the place where one may cook all kinds of things; besides it would be too hot, too dusty, and always more or less exposed to the light. Again, what is meant by Nelson's gelatine? The author, by his silence as to its origin, would lead one to believe that it was prepared from the bones of the celebrated admiral of that name. Evidently, however, this cannot be the case. It must, therefore, be a reclamation in favour of a manufacturer of the name of Nelson; but who abroad knows him? When a man publishes a formula, however curious it may be, he ought at least to make it appear practical to everybody. Now Nelson's gelatine comes in just in the nick to stop those among us who are Anglomaniacs from repeating Mr. C.'s experiments.

" I am far from desiring to contest the merits of the English in having advanced the photographic art; and, apropos of the advancement of that art among different nations, we have, in our little cœnaculum, decreed the palm to that nation for the improvements they have introduced in the optical apparatus. But as to their chemical formulæ we have, for the most part, found them to smack strongly of the kitchen.

" What progress, what amelioration has resulted to photography from the use of linseed, rice water, fine honey, metagelatine, ceroleine, glycyrrhizine, oxymel, methylated ether, chloroform, iodoform, iodide of tetrethylammonium, camphor, oil of cloves, naphthalised ether, alum, nitrate of barytes, acetate of lead, chlorides of barium and strontium, &c.&c.&c.? Now all these drugs, or rather all the formulæ containing them, come from the other side of the channel.

" We are convinced that the true friends of photography in England will agree with us in blaming this unreasonable abuse of a heap of substances which are rather hurtful than otherwise to the object they have in view, and which, in any case, disturb the minds of those who are not sufficiently proficient to comprehend their inutility. Even by the revelations of your journal we know that the photographic triumphs of Claudet, Crookes, and other learned and able English photographers, have been extended beyond the use of these photogenic compounds. Niépce has shown us that we may practise photography with all kinds of substances. We have approved his use of the salts of uranium, his application of ferrocyanide of potassium, because all of these modifications were rational, and contained the germ of a regeneration of the art. But we do not see any similarity between these and the application of the drugs of which we have given a greatly abridged list. . . . . . ."

PRINTING IN CARBON.*

BY M. DE BREBISSON.

The printing of positive proofs by means of carbon has, as yet, been too little practised for completely satisfactory results to be expected. Consequently, I should not have published my first efforts in this way, if I had not been assured that the Society wished to collect all the documents concerning this process. . . . .

When I began my experiments in the use of carbon for positive proofs, I had no precise information; I had, therefore, to continue my experiments, until I hit upon the following formula :—

In 100 parts of water, saturated with bichromate of potassa, I dissolved, with the assistance of heat, 8 to 10 parts of white gelatine. At this season of the year it is advisable to dissolve the bichromate in almost boiling water to make sure of saturating it. I make the solution of gelatine in a porcelain dish, which, when heated, preserves for a long time sufficient heat to allow of a large number of sheets of paper being prepared.

The paper I prefer is that the texture of which is finest, and which is well glazed. The sheets being cut in the desired form, I float them successively, for a few seconds, on the warm gelatine and bichromate of potassa bath; and, then, suspend them to dry. (I may observe, in passing, that this paper, though protected from the light, will not preserve its photographic properties longer than a few days. The gelatine seems to lose its solubility, and the designs are without vigour.) When the paper is thoroughly dry, I expose it under a negative in the printing frame. The exposure must be, at least, four times as long as in the case of the ordinary positive paper, coated with the chloride of silver.† When the deepest shadows have taken a rather red colouring on the paper tinted yellow by the bichromate, I withdraw the proof. It is not necessary to wait until the details of the half-tones are visible. Once more in the dark

* Read at the last meeting of the French Photographic Society

† To obtain even this rapidity it is necessary to use a solution prepared with crystals of bichromate, recently separated from the solution in which they were formed.

room, I place the paper acted upon, face upwards, on a glass upon which I fix it by means of gum.

The next proceeding is to cover the picture with a black powder, or with powder of any other colour, provided it is of extreme tenuity. Whatever the powder may be, its adherence to the paper is obtained by stumping its surface with a ball made of cotton. I at first used plumbago, lampblack, and ochre. I now accord the preference to a kind of black manufactured by M. Delahaye. It gives a less leaden aspect to the proofs than other charcoal blacks which I used previously.

When the black is spread evenly over the surface of the paper by means of rather light friction, the sheet of paper, blackened side upwards, is laid at the bottom of a basin, and covered with a film of boiling water. After a little agitation, this first water, which dissolves the greater part of the bichromate of potash, is thrown away. More hot water is then poured on, and the cleansing of the design proceeded with.

This operation may be performed with cotton rolled up into a ball, but I find it better to use a sort of brush made of shreds of fine muslin. Thanks to the handle of this little instrument, it is not necessary to scald one's fingers, which may very well happen with the cotton ball. By passing this brush over the surface of the proof, those parts on which the light has not acted are cleaned. The layer of gelatine on these parts remains soluble, and comes away easily, bringing with it the black substance which covers it. This part of the process must be performed with caution. The design may, sometimes, be improved by weakening the too deep shadows, or by protecting the vigours necessary to the effect. If the insolation has been too prolonged, the adherence of the black will be diminished, and the deep shadows will have a disagreeable reddish tint, which cannot be concealed. When, on the contrary, the action of the light has been insufficient, the gelatine comes off in large patches, even without the application of the brush, the design then clashes, and is without half-tones. The action of a cloudy but luminous sky is more favourable to a proof than the brilliancy of a strong sunlight, which attacks the shadows too rapidly.

In several papers, concerning this process, the spreading of the layer of black before insolation is prescribed, which seems to me not very rational. As may be imagined, the presence of the powder impedes the action of the light, and the design is never so perfect. Experiments that I have made on the different halves of the same paper leave no doubt in my mind on that point, since I have always obtained better results by applying the black after insolation. . . .

It is desirable that a black should be manufactured of a vivid tint, and not greyish, reduced to a powder as fine as possible, but not so fine as to prevent its molecules from remaining distinct; or, otherwise, shining patches will be formed where there ought to be appearance of *grain*. This fault exists more especially in the case of plumbago, the laminar molecules of which, always passing over the outlines, border it with fringes or inequalities, so much dreaded by lithographers and engravers.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

On the Preservation of Sensitised Sheets (continued).—This appears to be the place for strengthening our remarks by an important observation. Everybody must have observed, that photographic papers alter more on the back than on the face—a fact easily explained; since on the face the free nitrate finds itself surrounded by chloride of silver, which does not assist in the alteration; while the back is charged with free nitrate alone, which has been drawn there by capillary attraction.

The manner of manufacturing the paper, its porosity, and the nature of the substances with which it is sized, play a certain part in the alteration. Thus, we have remarked that, the strongly-sized English papers kept better than others; and that among the French papers, those which were the least sized were the first to change. This fact may be easily explained by the relative impermeability which the sizing gives to the paper, which thus acts as a check on the absorption of free nitrate by capillary attraction.

This observation has led us to think that the salts of aluminium, which possess the property of rendering tissues impermeable, might, employed judiciously, give to photographic paper preservative qualities. Experiment has verified this hypothesis. It has shown us, in fact, that positive papers prepared on a bath of chloride of sodium strengthened with only 1 per cent. of alum, kept much longer than the same papers prepared in the ordinary manner.

After having thus established the elements which intervene in the alteration of sensitised papers, we occupied ourselves in seeking the law which these obeyed. Recent experiments on the alteration of ozonometrical papers in moist air, led us to think that humidity must play a chief part in this reaction, and that if we could manage to preserve the paper in a condition of absolute dryness, it would preserve its value and properties in some undefined manner; and experiment has fully confirmed this idea. Fragments of positive papers of every manufacture were left for three months where they were protected from the light, in glass flasks hermetically sealed, and in which hygrometrical substances, such as chloride of calcium, carbonate of potassa, &c., were introduced in such a way as to desiccate not only the air therein, but the paper itself. At the end of the time named, the papers had not undergone the slightest change; they were not at all tinted, while the other parts of the same papers preserved simply in portfolios, were coloured with the intensity which every one has remarked.

Thus, when we preserve sensitised papers in a completely dry state, in an atmosphere likewise dry, they undergo no alteration; and, at the end of three months, are equally well-suited for photographic purposes as on the first day.

This method, of which no person hitherto has made known the principle or its application, may render the highest service to photography. Therefore we have had constructed by one of our ablest manufacturers, different models of apparatus adapted for the accomplishment of this object, and which, from their low price, may be accessible to all.

The employment of similar apparatus, the efficacy of which we have ascertained as regards positive papers, will probably, judging by experiments we are now conducting, offer the same advantages for sensitised negative papers, as well as for glass plates, and will enable photographers who reside at a distance from the place of manufacture to obtain papers ready nitrated without their being in the slightest degree deteriorated by the journey. It will likewise enable photographers to utilise a bad day by preparing a stock of paper for future operations, when the weather is more favourable.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY.*

BY T. FREDERICK HARDWICH.

THE publication of a fifth edition of a book on Photographic Chemistry, &c., seems to imply either that there is a great lack of works on the subject of which it treats, or that the book is the best of its kind. In the case of the book we are about to examine, both these reasons may have had something to do with its extensive sale; there is no other really good work on photography with, perhaps, one exception, which is of the same size, and none which more completely exhausts the subject in all its branches.

Mr. Hardwich commences his book with a historical notice of the rise and progress of the art of photography, which, interesting as it is in itself, would convey no infor-

* Continued from vol 1., page 279.

* Churchill. New Burlington Street.

mation to the readers of this journal, who have had such abundant opportunities of informing themselves of everything relating to the subject, from articles we have published in it at various times since its foundation. Nor is it necessary that we should dwell on that portion of the work devoted to chemistry, and the various manipulations, ably as Mr. Hardwich treats these subjects, since they have been, or are being, treated of in this journal in detail; we shall, therefore, proceed at once to a consideration of what the author rightly considers a very important part of his book, viz.: the nature and properties of collodion.

There are different varieties of pyroxiline, the peculiar character of each resting on the strength of the nitro-sulphuric acid used in its preparation. That called gun-cotton contains the largest amount of peroxide of nitrogen, and can only be dissolved in acetic ether. In the preparation of this the strongest nitro-sulphuric acid is employed.

Another form in which pyroxiline exists is termed xyloidine, and is the substance obtained by treating starch with nitric acid.

Neither of the above preparations is that employed in photography. The method described by Mr. Hardwich, and adopted by him in the manufacture of his collodion, consists in treating cotton-wool with a mixture of nitric and sulphuric acid in certain proportions; the effect of which is to produce a change in the properties of the cotton, increasing its weight by more than one half, and rendering it soluble in various liquids. The reason he gives for employing cotton-wool rather than calico or linen rags is, that the two latter are more likely to yield a bitter resin in the manufacture of collodion, the effect of which is to diminish the sensitiveness of the film to obscure radiations, while it increases the rapidity and intensity of the development in negative pictures.

Another effect of the action of the nitro-sulphuric acid is to *parchmentise* the fibre, so that good photographic collodion may be termed vegetable parchment rendered soluble in ether and alcohol. To this parchmentising of the fibre by the action of sulphuric acid is owing the peculiar firmness and strength of this collodion; and likewise Mr. Hardwich claims for it the merit that it gives a more intense negative image than ordinary pyroxiline, and is very clean on the parts not acted upon by the light. We have not yet had a satisfactory opportunity of testing its merits on these points, but as far as we have experimented we have not found it inferior to that of our best makers.

The nitro-sulphuric acid used in this operation is not the strongest that can be made, because, as we have already mentioned, the result in that case would be the production of gun-cotton.

In common with some other makers, Mr. Hardwich employs rectified ether of commerce as a solvent of pyroxiline, this containing a certain proportion of alcohol, the presence of which appears to be essential; indeed, we believe the proportion of alcohol used by Mr. Hardwich is considerably greater than that ordinarily used, being about equal in amount to the ether, the strength being ·810. The presence of ether in collodion in great excess renders the film very strong and tough, as well as contractile; the addition of alcohol changes this, and the film, which before was very tough, becomes soft, and possesses but little coherency; while the addition of a very small proportion of water would make it so rotten that it would wash off the plate.

Collodion which has been iodised with iodides of potassium, ammonium, or zinc, owing to a development of free iodine by a peculiar action of the ether, very soon assumes a yellow tint, which gradually deepens to a brown; consequently it is of the greatest importance that plain collodion should be kept in a cool place, and protected from the light, or otherwise it will become coloured immediately on the addition of the iodiser.

In the preparation of collodion, Mr. Hardwich keeps the material in the acids for ten minutes instead of five; and in this he agrees with the practice of the Abbé Desprats, who has just stated in an article on the subject, of which we shall shortly publish a translation, that, "ten minutes is necessary for a perfect transformation of cotton into pyroxyline;" but in other points they differ considerably, Mr. Hardwich being of opinion that "the lowest temperature at which good photographic pyroxyline can be made is about 180° Fahrenheit, and the highest at or near 200°;" while the Abbé expresses a decided opinion that the addition of artificial heat is quite unnecessary, and that a similar product suitable for all photographic purposes may be easily obtained by the reaction of ordinary sulphuric acid on pure nitrate of potassa, at the ordinary temperature. The modes of preparing this substance differ so much in minor points, and the results of some of these processes are so equally good, that we prefer to found an opinion of the collodion under consideration upon the results obtained by its means, and shall not, therefore, criticise the manner of its composition.

Another highly important matter, on which the author has bestowed great labour and research, is dwelt upon at considerable length, viz.—the uses and properties of the different salts of silver. The explanations given are so full and lucid, that they may be readily comprehended even by one who had no previous knowledge of chemistry. Much of the nitrate of silver sold to photographers is impure, and therefore unfit for photographic purposes; a circumstance sometimes unknown to the manufacturer, who may give rise to the impurity from his method of preparing the article without having any design of adulterating it, and who is unaware of the injurious effects such a method may have on the result; while there are, no doubt, some manufacturers of nitrate of silver who, tempted by the high price to be obtained for this substance, wilfully adulterate it. As regards the former course, we have been informed that one specimen in which charcoal had been boiled, on being tried, immediately turned what should have been a negative into a transmitted positive; doubtless, from the charcoal being contaminated with organic matter. It is, we have no doubt, in consequence of the impurities contained in the nitrate of silver, that we receive so many letters from correspondents complaining of faults in their baths; for which it is often impossible, from the description given, to suggest a remedy. Mr. Hardwich has exerted himself to induce some manufacturers to improve their process, and to a certain extent he has been successful. In more than one instance he has induced them to do away with the use of charcoal in making photographic nitrate, and also to prepare pure re-crystallised nitrate purposely for the bath at a very small additional cost.

He has re-modelled and divided into two portions that part of his work which refers to the composition of the image. He is of opinion that organic matter makes an essential difference in the properties of the image, and that it may eventually be found that it acts molecularly as well as chemically, although the former is by no means so evident to him as the latter.

The author's belief in the non-reduction of iodide has been strengthened by experiments; he also considers that the electrical images produced by Mr. Grove are unfavourable to the supposition entertained by some persons, that actinism and electricity are the same thing. In the experiments referred to, a plate of glass was electrised in certain parts, and then breathed on or exposed to the fumes of hydrofluoric acid; in both cases the vapour settled exclusively upon the non-electrical parts of the glass. When the glass was electrised, then coated with iodide of silver and exposed to light, pyrogallic acid produced no reduction.

In the present edition the author dwells at some length on the importance of the presence of bromide in the ordinary iodised collodion used for taking positives; the effect of it being to alter the molecular state of the reduced silver, and to give it a white and metallic appearance, on which to a great extent the beauty of the picture depends. The use of bromide in the collodion with sulphate of iron as a developer,

renders the quality of the pyroxiline a matter of less importance than in the preparation of negative collodions. "Hence the selection of the soluble cotton may be made principally with reference to physical properties, such as smooth flowing and adhesiveness to the glass; and, indeed, the same plain collodion may be used both for positive and negative pictures, the distinction being simply in the iodising solution. In cases, however, where pyroxiline is made purposely for positives, it is as well to prepare it at a tolerably high temperature, since the more gelatinous kinds of collodion have a property of throwing the bath solution into greasy lines, which show upon the picture; and it is advisable also that the pyroxiline be made in nitro-sulphuric acid, with enough of the oil of vitriol to prevent it from *giving an opaque film* when the acid mixture contains the full quantity of water."

In introducing the bromide the operator should be guided as to its quantity by the appearance presented by the developed image. If the high lights appear too dense when the plate has been exposed long enough to form the shadows, it is a sign that more bromide is required; if, on the contrary, the positive is grey and feeble, and this does not arise from over-exposure, the quantity of bromide used should be less. An important effect of the bromide in collodion when in a proper proportion with the iodide, is in keeping the lines sharp and clear during development. The presence of the bromide does really appear to increase the sensitiveness of the film to the action of the light, especially when the collodion is partly decomposed; but this will not be evident if the bath be a weak one, and pyrogallic acid be used as a developer. To bring out the picture it is necessary that the strength of the silver bath should be increased, and sulphate of iron substituted for pyrogallic acid as the developer. The strength of the bath may be carried as high as forty grains to the ounce; and Mr. Hardwich recommends, with good reason, the employment of nitric acid to acidify this bath rather than acetic acid.

In the present edition of the work under review, the observations on collodion negatives are much fuller than in any previous one, and the properties of the chemicals employed are more minutely analysed.

The directions for photographic printing are most elaborate. The various processes of toning are fully described, not omitting that which has excited a good deal of attention lately, viz.—the alkaline chloride of gold process. This process is, however, by no means a new one; there is good reason to believe that it was tried a very long time ago in Paris, before Mr. Waterhouse published his method, though it does not follow that Mr. Waterhouse did not make an independent discovery. It is unfortunate that the re-discovery of different photographic processes should be so frequent, and that a photographic chemist, after researches which have extended over, possibly, many months, should be told when he publishes the result of his experiments, that they are not new, and that M. So-and-so has done the same thing long before. However, we think there is very little chance of accidents of this kind occurring now that the "PHOTOGRAPHIC NEWS" is established, and if any English photographer is subjected to any such annoyance in future, it must be from his own fault.

Of course, the dry collodion preservative processes receive a lengthened notice, and the writer gives a formula for the preparation of pyroxiline from cotton wool, which he considers better adapted for the dry process than that made from calico or linen, inasmuch as it is more stable, and bears more alcohol without losing its setting powers.

Although we do not deem it necessary, for the reason stated at the commencement of this article, to review at length that part of Mr. Hardwich's book which treats of the various manipulations and processes, a knowledge of which is of so much importance to beginners, we cannot close our remarks without referring to this, in some respects, the most important portion of his work. We have gone through this part of the book carefully, and, though we could have suggested one or two slight additions, we cannot help expressing our entire approval of the minute and lucid manner in which this part of the subject has been treated. With such a guide, a man might commence the study of photography, and with no other he might become as expert a photographer as any one living.

Lessons on Colouring Photographs.

COLOURING IN OIL.

THE use of oil colours for finishing photographs has come very much into favour the last few years, not simply for the beauty and richness of the effects which may be produced, but from the conviction that the permanence of the photograph is very considerably increased thereby, the colours themselves and the subsequent varnish largely protecting the picture from outward destructive agencies; so that, if the print have been fixed and washed with anything like adequate care, it may, when coloured in oil and varnished, be regarded as a very near approximation to entire permanency. To the uninitiated the attempt to colour in oil appears very formidable, and one attended with greater difficulties than the use of water colours. This idea is, we apprehend, founded on a mistaken notion. In either case, some knowledge of drawing is necessary to perfect success; but the use of vehicles which preserve their transparency when dry, such as oil and megilp, must offer the greatest facilities to the tyro for preserving the likeness whilst colouring the photograph.

To choose the photograph.—There are two modes of looking at the subject of colouring; one which professional artists most commonly adopt, of regarding the photograph as the basis of a painting,—the other, which photographers are most likely to prefer, of regarding the photograph as a picture perfect in itself, merely requiring the addition of colour in its most simple and transparent form. The latter plan will not always give the most perfect finish, or the most brilliant results; but it will be much more easily practised by the entire novice, and we recommend him to confine to it his first efforts; if he can ultimately achieve more, so much the better. To succeed, then, in this style, it is necessary to select a perfect photograph to work on. It should be clean, sharp, and brilliant, with pure lights, well marked shadows, and good gradation of half-tone. Heavy abrupt masses of shadow severely task the skill of the practised colourist, and would be a complete barrier to the success of the novice. A warm grey or purple brown, not too heavy, is the best tone to select,—a black, inky-looking picture should be avoided.

To prepare the photograph.—For colouring in oil, a print on albumenised paper is best. It should be mounted on cardboard, taking heed to have the gelatine, glue, or whatever may be used for mounting it, free from small pieces of anything hard, which would cause small inequalities in the surface, for these would show very much in the finished picture with a varnished surface. The photograph must then be well sized with a solution of gelatine or Salisbury glue, applying it with a broad, flat camel's-hair brush. Experience will be the best teacher as to the thickness of the sizing. If it be too thick, it will be apt to crack off, and if too thin the oil will be absorbed into the paper, and will "bear out" unequally in drying. When the sizing is dry, the picture should be hot-pressed, or passed between steel rollers. It is then ready for use.

Materials.—These should be purchased by the beginner ready for use; to commence with, the equipment need not be very expensive, but it will be decidedly best to procure a complete box of oil colours, &c., prepared for colouring photographs. The articles necessary to commence with are colours in tubes; various vehicles, and varnishes; pallette, pallette-knife of steel, and another of ivory for use with colours which injure by contact with iron; brushes, and a rest or Mahl stick.

The colours required are as follows:—White, Naples yellow, burnt sienna, raw sienna, extract of vermilion, light red, rose madder, crimson lake, Indian red, red umber, burnt umber, Vandyke brown, terra verte, emerald green, ultramarine, cobalt, Prussian blue, purple madder, brown madder, ivory black. Other colours may often be found valuable, but these will serve to commence with.

Vehicles are the diluents or fluids with which colour is combined for the purpose of working, and the colours dry and "bear out" with different effects according to the vehicles used. The oils used for this purpose are those of linseed, poppy, and nut; the former, drying best, are most generally used. Turpentine is occasionally used to thin with, but should be used very sparingly, as it causes the colours to bear out dead. The most valuable diluent to the amateur colourist is megilp, as, whilst it thins the colours, it does not cause them to flow too much in working; it moreover dries rapidly and preserves the utmost transparency in the colours. It is generally made by the mixture of some varnish and a drying oil, with the addition of a little sugar of lead as a dryer; the result of the mixture is a transparent jelly, which combines with the oil colours readily, and works well. Equal portions of pale drying oil and strong mastic varnish will answer the purpose, but the amateur will do wisely to purchase it ready prepared.

The brushes most useful are those of sable; they should taper to the point well, with a wedge-like shape, retaining the point when wet instead of separating into two or three parts, and should spring well. A few hog-hair tools will sometimes be useful in large pictures, and also a badger tool softener. It is important to have a good selection of brushes and to take care of them; they should always be carefully cleaned immediately after use, for if left clogged with colour they will be ruined. They should be rinsed in turpentine and dried with a soft rag, bringing them to a fine point to finish. A small vessel containing turpentine should always be at hand for the purpose.

Of varnishes the most useful is mastic; as it is brilliant and clear, works well, does not crack, and is most easily removed if required.

A variety of other materials will from time to time be found useful; but we have named the materials with which the picture may be commenced and finished satisfactorily.

(To be continued.)

Photographic Chemistry.

ANALYSIS OF SILVER BATHS.

After what has recently appeared in the "Photographic News," on the subject of the impoverishment of the silver bath by the papers submitted to it, it is scarcely necessary that we should dwell on that fact; we may merely mention, therefore, that each sheet lessens the richness of the bath in proportion to the quantity of iodide or alkaline chloride with which it is impregnated; consequently, it is advisable to make a rapid analysis occasionally of the actual richness of the silver bath. By manipulating with care, a closely approximative analysis may be made in a very short time, by means of the following process:—

The analysis of nitrate of silver baths which do not contain either hyposulphite of soda or cyanide of potassium, is founded on the fact, well-known to photographers, that salt decomposes the nitrate of silver, and precipitates the silver in the form of an insoluble chloride; this decomposition being effected in strict proportions—for example, 10 cubic centimètres of normal salted liquor (composed of 5·41 grains of perfectly pure and dry salt in 50 cubic centimètres of distilled water) decomposes precisely 2 grains of nitrate of silver, that is, converts it into an insoluble chloride. To test the quality of a nitrate bath the following plan may be adopted:—Pour 10 cubic centimètres of the normal salted liquor into a stoppered bottle, then a few drops of nitric acid, and, finally, about 10 cubic centimètres of distilled water. Pour a certain quantity of the solution to be analysed into a graduated glass, from which it must be allowed to drop into the stoppered bottle. A precipitation ensues immediately on the liquids coming in contact; and when the whole of the solution is thus decomposed, put the stopper in the bottle and shake it violently; then let it stand for a few seconds, a precipitate falls to the bottom, and the liquor above is quite clear; add a little more of the solution from the graduated glass, at the same time shaking the bottle gently after the addition of each drop to clear the liquid, and mark well the moment when the added drop produces the slightest possible disturbance, and the additional drop none whatever. The test is concluded; by reading on the graduated glass the quantity of silver solution required to saturate the liquid in the bottle, and by a simple rule of three sum, the quantity of silver contained in the bath will be at once perceived.

The above method is applicable to baths of all kinds, whether acid or not, but we may as well give another suitable for testing non-acid baths.

The sole difficulty in the process described above is to seize the exact moment when a drop of the solution to be analysed produces no disturbance in the salted solution, but this difficulty does not present itself when the following process is adopted:—Measure 10 minims of normal salted liquor and pour into a glass; add to it a few drops of solution of bichromate of potash, and, if the bath to be analysed is concentrated, a little distilled water; the liquid will appear of a straw colour. Hold the glass in the left hand, and, by a gentle and steady motion, keep the liquid rotating. With the right hand pour from the graduated glass measure, drop by drop, the solution of nitrate of silver. At first there will be a white precipitate formed; but towards the end of the operation each drop of the silver solution will cause a red spot as it falls into the test solution, which, however, will immediately disappear; until the moment arrives when a single drop suddenly changes the colour of the solution to a permanent crimson red, due to the formation of a little chromate of silver, which happens at the precise moment when all the chlorine of the chloride of sodium has passed into the state of chloride of silver. The operation is now at an end; and it is only necessary to read off the glass the quantity of silver solution used, and to divide these figures in the manner given above, to find the strength of the bath.

(To be continued.)

Dictionary of Photography.

Bronzing.—In printing on albumenised paper it sometimes happens that green metallic patches occur on those parts of the paper which have been exposed to the strongest light; and not unfrequently the same appearance is observed in streaks and lines on other parts of the paper. This defect may be obviated by employing the eggs quite fresh and having the albumen well beaten up and then strained so as to separate the fluid portion from the opaque stringy particles of *germ*. If any of the latter get on to the surface of the paper, bronzing is sure to be produced. The paper must also be lowered on to the surface of the prepared albumen with a perfectly uniform motion: any stoppages will be liable to produce bronzed lines across the paper. Any scum on the surface of the albumen salting bath must be removed by drawing across it the edge of a sheet of paper, otherwise the effect we are speaking of will be produced by the adherence of the scum to the surface of the paper. Another very fertile source of bronzing is occasioned by the sensitising bath being too strong in proportion to the amount of salt present in the first bath: 30 grains of salt in the salting bath will bear 120 grains of nitrate of silver without danger

of bronzing, but if, as some operators prefer, the salt be reduced to 3 or 4 grains to the ounce, then the silver bath should not be stronger than a 90 grain solution. Bronzing is also frequently produced in the summer months owing to the intensity of the sun's action *burning up*, as it were, the parts of the paper under the transparent parts of the negative before the more shaded parts of the paper are impressed sufficiently deeply; the remedy for this is either to print in the shade or diminish the strength of the silver bath. With some negatives, in which the contrasts of light and shade are very violent, it is next to impossible to produce a good print without some parts appearing bronzed.

Buckle's Brush.—A kind of brush which is of great use in the calotype process, made by inserting a pellet of cotton wool into the end of a glass tube, leaving sufficient exposed to answer the purposes of a brush. For a further account of these useful brushes see vol. i. p. 288.

Buff.—An instrument used for polishing glass or daguerreotype plates: it consists of a piece of wood from 1 to 3 feet in length, and 2½ or 3 inches wide, with a handle projecting from one end. It is slightly convex at the under side, which is covered with some soft material and well padded with cotton wool. Either silk velvet plush, velveteen, or leather may be used for this purpose, but the best material of all is deerskin. It should be well dressed, and deprived of all grease or extraneous matter, and soft and firm in texture.

Cadmium.—A metal similar to zinc in its chemical relations and resembling tin physically: it is very malleable, and is nearly as volatile as mercury, melting below 500° Fah. Its chief value in photography is in its combinations with chlorine, bromine, or iodine, with which elements it forms well-defined crystalline compounds, stable in the air and soluble in alcohol or ether. The preparation of these salts has been fully described in vol. i. pp. 82, 276, 293. Metallic cadmium is sometimes used to remove the red colour from old collodion, which it does by virtue of its affinity for iodine, to which the colour is due.

Calomel.—The ordinary name for subchloride of mercury, $Hg_2 Cl$. In combination with chloride of silver it forms the white compound to which the beauty of the so called alabastrine photographs is due. It is formed by the union of half of the chlorine present in the corrosive sublimate (Hg Cl.) with the metallic silver forming the picture. Our chemical readers will at once understand this if given in the form of an equation:—$Ag + 2\,Hg\,Cl = (Ag\,Cl + Hg_2\,Cl)$; thus two parts of corrosive sublimate are required for one of silver, and the result is the formation of a white compound consisting of equal parts of chloride of silver and calomel.

Calorific Rays.—The invisible heating rays which emanate from the sun, and from burning and heated bodies. They are the least refrangible of any rays of the solar spectrum, and are those which are least understood, owing to the very imperfect means which we at present possess of estimating their presence qualitatively or quantitatively. Now that M. Nièpce has discovered a chemical compound which is sensitive to heat (vol. I. p. 277), we hope that the least refrangible end of the spectrum will receive some of that attention which has, up to the present time, been principally directed to the blue end.

(*To be continued.*)

A Catechism of Photography.

IODISING THE PLATES.

Q. How are the albumen plates to be iodised?

A. By submitting them to the fumes of iodine, as in the daguerreotype.

Q. What length of time will this occupy?

A. From two to four minutes, according to the temperature of the room. The vapour of the iodine imparts a yellowish tinge to the albumen.

SILVERING THE PLATES.

Q. How are the albumen plates silvered?

A. The process of silvering is performed by the plates in a nitrate bath composed as follows:—

Water	12 ounces.
Nitrate of silver	1 „
Glacial acetic acid	1 „

The solution should be filtered, and a gutta percha bath is recommended.

Q. How long should the plate be allowed to remain in the bath?

A. About one minute and a half. The plates must then be thoroughly washed in distilled water, and placed in a slanting position to dry.

EXPOSURE IN THE CAMERA.

Q. After silvering the plate is it ready for the camera?

A. No; previous to placing the glass in the camera slide it must be passed over the vapour of iodine.

Q. How long a time is necessary for obtaining a good impression?

A. This depends on the colour of the object, the intensity of the light, and the size of the aperture of the camera. The time varies from thirty seconds to ten minutes.

Q. Is not gallic acid sometimes used to hasten the taking of the image?

A. Yes; for this purpose the glass should immediately before using be dipped into a bath of gallic acid, in the proportions of one part acid to ten parts of water.

DEVELOPING THE IMAGE.

Q. How is the albumen image developed?

A. By plunging the plates into a solution of gallic acid.

Q. How is the solution prepared?

A. In the following proportions:—1st. A saturate solution of gallic acid; 2nd, 1 ounce of nitrate of silver in three ounces of acetic acid and thirteen ounces of water. A pint bottle is to be filled three parts with this solution and filled up with water. A sufficient quantity of the first solution to cover the plate is to be poured into the developing dish, and eight or ten drops of the second solution added.

Q. Is the picture rapidly developed?

A. No; it takes several hours, and a few extra drops of the second solution are to be added at intervals.

Q. What is to be done when the picture is fully developed?

A. It must be thoroughly washed in pure water and dried.

Q. Is there no quicker mode of developing the picture?

A. Yes, by pyrogallic acid, but the half tones are seldom so well preserved.

FIXING THE IMAGE.

Q. How is the albumen picture fixed?

A. By being washed in a bath of hyposulphite of soda. This completely removes the yellow iodide, and the picture may then be rinsed in clean water and dried.

Q. Are there not other methods of obtaining albumen pictures?

A. Yes; there are several methods; the formula here given is founded on that of Mr. J. E. Mayall.

OTHER APPLICATIONS OF ALBUMEN.

Q. Are there not several methods of using the albumen process?

A. There are: that of M. Fortier, Mr. Negretti, and others. All differ in some particulars, while they are the same in the main principles.

Q. Is the method of cleaning the glass varied in these processes?

A. No, cleaning the glass is absolutely the same in all; and is similar to that which is used in the collodion process.

Q. In what respect do the processes chiefly differ?

A. In the method of preparing and applying the albumen. Thus, some photographers employ iodide of ammonium in preference to iodide of potassium; some prefer decanting the albumen after it has been prepared, and others use it out of the basin in which it has been mixed. Negretti, for instance, prefers it on this account, as he says that the albumen, after it has subsided, leaves a thick crust on the top, and, in order to pour it on the plate, it has to force itself through this crust, consequently, it filters itself at the same time.

Q. Is there much variety in the other parts of the process?

A. No; except such as are peculiar to each operator.

Q. Is not the process of M. Bacot more rapid in its action than that which is generally employed?

A. It is; the process is as follows:—Heat in a china capsule a solution of—

Distilled water	45	parts.
Dextrine	9	"
Iodide of potassium	3	"
Bromide of potassium	0·5	"

Add to it the whites of six eggs, from which the germ has been previously removed. Beat up thoroughly with a wooden or silver fork.

Q. How soon may this preparation be applied to the glass?

A. In about two hours; the plate is then dried, and exposed to the fumes of iodine until it attains a golden tint; it is then sensitised in a bath of—

Distilled water	280	parts.
Nitrate of silver	32	"
Crystallised acetic acid	30	"

It may immediately afterwards be washed, dried, and exposed in the camera.

Q. How is the picture developed?

A. In a warm solution of—

Distilled water	400	parts.
Gallic acid	7	"
Acetate of chalk	3	"

The glass must be plunged into this solution, and when it has cooled a few drops of the following should be added:—

Distilled water	100	parts.
Nitrate of silver	6	"
Acetic acid	20	"

Q. How is the impression fixed?

A. In a solution of hyposulphite of soda.

(To be continued.)

Correspondence.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

Sir,—I beg to be allowed to offer some remarks on the subject of the Exhibition just concluded. It is possible they may not exactly coincide with your own opinions, but, convinced of your impartiality in such matters, I do not think you will refuse them admission to your columns.

Of the Exhibition itself, as the articles you have published have exhausted the subject, I shall only observe that it proves how very little superiority one process possesses over another in the reproduction of pictures when the photographer is a skilful manipulator and an artist. The pictures on which I propose to offer some observations, are those exhibited by Mr. Rejlander and Mr. Robinson; I shall commence with the former gentleman.

Most of your readers will probably remember that when Mr. Rejlander exhibited his picture of the "Two Ways of Life," it excited a good deal of discussion; some objecting to it on the ground that it trenched on the province of the painter; others, that the attempt to depict an allegorical subject by means of photography, was ridiculous, and the result a failure; others, again, objected to it on the simple ground that the picture was an improper one. Now, I do not myself entirely agree with these objectors, though to a certain extent I consider that all of them are well-grounded. I did not forget that this was a first attempt to produce a photograph of such pretensions; and though, in the interest of the art, I should have been better pleased if the artist had chosen another subject, yet I could find an excuse for him in his desire to make a picture which should attract the greatest amount of attention; which might, however, have been attained sufficiently without placing an undraped female, whose attitude and expression were equally objectionable. Of course, I can anticipate the answer this remark will elicit—"that impure minds alone conceive impure thoughts from gazing at a work of art," &c. &c. But, as I have already said, there was some novelty in the idea, and I am not disposed to find fault with the artist on this score. What I complain of is, that his last productions should have been more objectionable than that to which I have alluded; and we think the committee might have made a better selection than these clever but objectionable pictures of Mr. Rejlander. In one of the inner rooms there hangs a frame in one corner of which is represented, or attempted to be represented, a man in the seventh stage of life; and in the opposite corner, a hideous object, which I at first took to be a representation of the Gorilla, but which closer investigation led me to conceive was intended to convey the notion of a madman; and a more revolting object in the form of a human being I never saw: but in the centre of the frame Mr. Rejlander has taken care to give the eye of the spectator some relief by a photograph of the beautifully formed figure of his model, artfully posed, so as to *force* the attention of the spectator to objects which would not fail to attract his notice under any circumstances. With respect to the two first figures, I do most strongly protest against these representations of humanity under its most humiliating aspect. If it were the inevitable lot of man to become mad or doting, it would be a different matter, the picture might convey a moral lesson; but as we do not habitually lose our senses, nor, as far as my observation extends, invariably or commonly become dotards in our old age, such pictures are simply monstrosities, and, to say the least, are neither true to nature, nor agreeable to look at.

In the next room there is a picture by the same artist intended to represent, the infant "Mewling and Puking in its Nurse's Arms,"—no, I mistake, not in its nurse's arms, but on a table, or something of the sort; its nurse is standing by, her whole attitude and demeanour offensive to good taste. Such are the pictures which a committee of the Society have thought deserving of a conspicuous place in the Exhibition, and such are the pictures which a photographer—whom we all know to be capable of producing more beautiful things in this line than almost any other man—has thought good enough to send to the metropolitan exhibition.

I now proceed to offer some observations on one or two of Mr. Robinson's pictures, and chiefly on that which has been, in my opinion, so greatly over-praised. I need hardly say, I allude to that known as "Fading Away." If Mr. Robinson had done nothing more of this kind, I should not have thought it necessary to pass any strictures on a solitary instance; but when I see the same figure represented in the last stage of consumption under the title of "She never told her Love," I cannot but recognise a species of trading on the most painful sentiments which it is the lot of human beings to experience. In the first picture there is a manifest want of refinement and artistic feeling. The absence of expression in the mother's countenance, of which so many critics complain, is not evident to me; on the contrary, I can readily conceive that a mother who had been accustomed for weeks, or months, to see her child slowly dying, and who had a firm conviction that the separation which was about to take place was only for a time, and that she would soon meet her again in a world where death could not enter, *would* acquire that calm expression; neither do I object to the expression of the young woman who is looking down upon the poor dying girl's face: but I *do* object to the introduction of the burly figure who stands with his back towards the spectator. Speaking artistically, he is a great

blot in the picture, which would be infinitely better if he were absent; and looking at his presence there from another point of view, it must be offensive to every right-minded person. The sentiment which his presence is intended to convey, is one which a true artist would only have hinted at afar off, and the prominent manner in which it is thrust before us in this photograph, is only suggestive of a desire to "pile up the agony." Now, a death-bed is not the place for indulging such a sentiment, and if it existed in reality it should have been kept out of the picture. Moreover, in the present case, it excites disgust rather than any other feeling, because the poor little sufferer is evidently a mere child, and could never have been looked upon in any other light.

Mr. Robinson does not, like Mr. Rejlander, appeal to the passions, but to a kind of morbid sentiment; and it would be difficult for him to have chosen a subject calculated to excite painful emotions in the minds of so many persons in anything like the same degree. How few there are among us who have not to lament the loss of some dear friend or relative by this terrible disease, and whose recollections, and consequently painful emotions, are revived with such intensity as to make their visit to the exhibition a source of pain instead of pleasure. Mr. Robinson was, doubtless, well aware of the extent to which a picture of this kind would appeal to the sensibilities of the spectators, and I am forced to believe that it was this knowledge which led him to carry his conception into execution.

I trust the gentlemen whose pictures I have referred to will not imagine that I have been actuated by any personal motive in singling out their works for condemnation. I have not the slightest personal knowledge of either; nor any desire except to see a stop put to the more extended production of such subjects. I wish to express the high opinion I entertain of their abilities as photographers, and to advise them to confine their practice to the reproduction of subjects which the public may look upon with pleasure. At the same time, if they continue to give us works of this kind, I hope the council will pause before they allow them to be hung at any future exhibition; and if Mr. Robinson and Mr. Rejlander were to remove the objectionable pictures at once from their public prominence, they would act wisely, and such an act would be advantageous to their reputation.—I am, Sir, your obedient servant,

AN *Ex*-MEMBER OF THE COUNCIL.

THE WET *versus* THE DRY PROCESS.

MR. EDITOR,—Your "NEWS" might well be called "The Practical Photographers' Guide," it abounds with so much that is really useful. I always preferred the practical to the mystic theoretical. From my infancy, it seems, I have been fond of it. One instance will suffice. When but a child and some repairs were being done in my father's house, having heard the plasterer say to his man that there was not enough of hair in the lime, I very coolly took my younger brother into a room, and, with a pair of scissors, clipped off his hair, without the least regard to his personal appearance, and supplied them with the desideratum.

When Fothergill's dry process came out I gave it a fair trial, and the first view (Glasgow Harbour, 8 × 10) was so excellent that I prepared a number of 8 × 10 plates by that process, and my friend Mr. W., another member of our practical society (a very successful Hill Norrisite), prepared a number of stereoscopic ones by his mode, and we started on a photographic tour to the far-famed scenery of the "Lady of the Lake,"

> "*In autumn*, sae pensive, wi' yellow and grey."

We left Glasgow in the afternoon and got to Killearn—stayed all night at Deacon W.'s—started next morning in his dog-cart, accompanied by two friends—went by the Aberfoyle-road—passed through the bustle and excitement of digging, building, and laying the huge pipes of that gigantic undertaking—the conducting of the Loch Katrine water to supply Glasgow for domestic use—passed Gartmore mansion and arrived at the "Clachan" of Aberfoyle, of Rob Roy celebrity, when we took view No. 1, viz., Aberfoyle Inn, with a harvest-field foreground, Lockard, &c., in the distance. After some refreshment, we found that the spring car (for the hills) was engaged by an English lady and gentleman, but who kindly allowed our traps to go with them to the Trossachs. The day being fine, we left our overcoats, and with tripod in hand we took our journey across the hills to our base of operations, the "Trossachs." The views which could be taken on the road are endless, and truly magnificent; and when Lake Vennacher broke on our view, and then Loch Achray, we were perfectly entranced—

> "So wondrous wild, the whole might seem
> The scenery of a fairy dream."

On looking behind us we saw the spring car jolting and toiling on, and we were fully half an hour at our destination before it. After getting our traps out, and thanking them for their kindness, we set out for work,

> "Where the rude Trossach's dread defile
> Opens on Katrine's lake and isle."

Picture No. 2. View from right of the ferry-house, looking down Loch Katrine, &c., with our two friends disposed in the foreground. While here, a young English gentleman unfortunately pitched his camera rather near the road, for, while standing watch in hand, half-a-dozen coaches with tourists rushed past him one after the other, turned, and re-passed him, to wait the arrival of the steamer's passengers for Cullender. He had, likewise, a further annoyance, in a silly lad (who was more knave than fool) selling Highland nuts, who would always place himself in the way of the lens; a silver sixpence, however, opened up his comprehension at once, when all other modes failed. One of our party kept him out of our way, by pretending to drive a hard bargain with him, till we had done—he being done at the same time. Picture No. 3, from a little way down the loch, taking in the ferry-house, Ben-Venne, and the foot-path, our two friends arranged on favourable points for the picture. Whilst exposing, a joyous party of young ladies, with their father, passed, which considerably chagrined our friends, who flattered themselves on their judgment of female beauty, but couldn't turn round to catch even a passing glimpse of these "ladies of the lake," but stood rivetted to the spot, as if biologised, while we could scarcely keep our gravity at their position; and they were wild when we told them that they were perfect specimens of English beauties. After taking Ellen's isle, and a few others, the sky got suddenly overcast, and a few drops of rain fell, and then there fell such a torrent, it fairly deluged "fairy land," and we had to run for it. At Trossach's Inn we found the spring car ready, which had been engaged to take us back to Aberfoyle—in we went;—

> "Across the stream we took our way,
> That joins Loch Katrine to Achray."

And then across the mountains, the rain, if possible, getting worse. On ascending the first hill we had all to come out and walk, it being so steep, when our two friends set off to "walk it" home, while Mr. W. and I drove and walked, as necessity required, with our coat-collars turned up, and our focussing cloths over our shoulders (many a time were they wrung dry, and donned again); at last we got to Aberfoyle Inn. Although thoroughly "droukit," we kept up our spirits wondrously, and had many a hearty laugh, although sometimes on the wrong sides of our mouths. Two of our party took off boots, stockings, and trousers, to get them dried at the kitchen fire; the one had on drawers, and looked queer enough, but the other, not having on such nether garment, looked queerer still; and we laughed outright when he complained of the rough haircloth seat. After a *petit verre d'eau de vie*, and a "tousie tea," we got, so far, comfortable. Our dog-cart was now ready, but poor Mr. R. could not get on his boots, and had to get his feet and legs wrapped up in straw, and to be lifted into his seat of honour, as our "Jarvie." Being all seated, and having lit our cigars, away we started for Killearn, where the Deacon's

wardrobe afforded us a complete transformation from top to toe. When we got into the dining room to tea, some friends were there to meet us; and, there being some good pianists present, we tripped it on the light fantastic toe, and chased away any casual acquaintance we might have formed with Master Rheumatism. Many a time that night we mistook each other's identity, in our new habiliments. Next morning we started home to develop our resources. Nothing appeared but haze—the resinous effects of the pine boxes which contained our plates, and the saturation with rain, had completely ruined them.

Having given my first campaign with the dry process (although the wettest I ever experienced), I feel inclined to abide by the wet. I have no difficulty with it, and always satisfy myself with a picture before leaving the spot. The dark box described in vol. i., p. 297, comes nearest the one I use, but mine can be folded up like a portfolio, and is mounted on a perambulator, which also carries a necessary supply of eatables as well as chemicals, &c.

Some of our practical society intend exchanging the pictures they take this season with those of other kindred spirits, so as to vary their portfolio.

In the prosecution of the delightful art of photography there occur so many amusing incidents, that I have commenced making a collection, and shall be happy to receive such as any of your readers may feel disposed to send.

4, St. Enoch-square, Glasgow. A. MACTEAR.

Miscellaneous.

THE GLASGOW PHOTOGRAPHIC SOCIETY.—The above society contemplate holding an exhibition during the course of the next month. In the prospectus issued by the joint secretaries, we are informed that not more than twenty specimens will be accepted from one single exhibitor; and those who contemplate contributing, are ordered to send their contributions before the twentieth of this month. The other regulations may be found in our advertising columns, and are similar in character to those at other exhibitions. We recommend this to the notice of photographers.

THE LATE MR. JOHNSON.—The *Times* has announced, within the last few days, the death of Mr. Johnson, the chief of the Radcliffe Observatory; and, in doing so, has spoken of his character and acquirements with well-merited eulogy. Having ourselves been engaged with him in carrying out the arrangements for recording certain meteorological phenomena by means of photography, we were necessarily brought into intimate contact with him for a considerable period; and, in recording this painful announcement of his death, we have a melancholy satisfaction in bearing testimony to the justice of the observations of the *Times* with respect to his private worth, and his exalted scientific attainments.

HOW TO OBTAIN PHOTOGRAPHS OF THE MOON AND THE INHABITANTS THEREOF.—We were not a little amused by an announcement which appeared in a very serious foreign contemporary to the following effect:—"Suppose that a successful attempt were made to obtain a surface for the photographic picture perfectly free from irregularities capable of distorting the most imperceptible lines of a photograph. Suppose also that on this surface a photograph of the moon were taken with every precaution; if this picture were examined under a very powerful microscope the most minute details would become visible, and if the instrument possessed sufficiently high magnifying power you would be able to see living beings, if there are any residing in that luminary. This is one of the applications of photography to astronomy; and it has been said that an Italian *savant*, after trying for six years to obtain this result, has succeeded, and has recently been able to obtain pictures of the moon on which figures of naked animals are depicted, one species of which bore a great resemblance to human beings. . . . . . . It is certain that important discoveries may be arrived at by this means; the great difficulty being to find a substance on which to take the picture, the surface of which shall be so perfectly even as to receive the luminous image without in the slightest degree distorting its most minute details."

Photographic Notes and Queries.

PORTABLE DARK TENT.

SIR,—At pp. 273 and 284, vol. i. of the "PHOTOGRAPHIC NEWS," you give plans for portable dark rooms, which I do not think as convenient, in every respect, as one I contrived some months ago—and which, with your permission, I now beg to lay before our readers.

It is all contained in a flat box, 26 inches long by 16 wide, and 5 deep, *inside* measurement, made of light ½-inch pine, weighing about 6lb., and is carried by a strap and buckle.

The top or lid taken off, it has an overlapping ledge all round to keep out dirt; on the under surface of it two trussels are hinged, which turn out; and, being kept expanded by hooks or rods, it forms a very nice table, standing about 24 inches high.

On this table the box is placed; the front of it falls down on hinges, adding 5 inches to the length. Two light frames are made, 25 inches long by 15 wide, like figure A; these are cut and hinged at B B, so as to fold each into *half the length*. One of these frames is then hinged on the bottom of the box at each end, the hinges B B meeting in the centre, and so that each frame can be raised to its full height, 25 inches, so as to form the ends of the chamber. A third light frame, to form the roof, is then made and hinged at C C, to the ends, so that the whole lies flat in the box when shut up, or forms the frame of the chamber when expanded; this chamber will be 25 inches square by 15 wide, or deep, from front to back. When expanded, it is kept upright by hooks and eyes, or, better, by a slip E of deal 2 inches wide and 25 inches long, extending from one end frame to the other, at the middle hinges—this slip forms a convenient shelf for the plate-holder, collodion, bottle, &c.

When constructing these frames, provision must be made for the yellow glass windows, either on ends or top—mine are in the upper half of the two ends.

Well, when this is so far complete, expand your frame work to its full size, and neatly cover the top, ends, and back with any *light-proof* material—mine is waterproof alpaca—nailing it closely on the frames, and to the bottom of the box, all round the ends and back; and, cutting out the spaces for the windows, put in the glass, and paste your cover over them, for, say ½-inch all round.

You then have a dark chamber, open in front with yellow glass windows, according to fancy, in tops or ends. Then,

take 102 inches long of black glazed calico, and the same of yellow, lay them one over the other, and join the ends so as to form an endless roller, 100 inches long; nail one selvage of this roller *inside* the front of your chamber to the frames, and to the bottom, taking care not to let it interfere with the shutter of the falling front. On the other selvage of the roller, you form what ladies call *a casing*, in this you pass a *strong* elastic tape or ribbon, say 20 inches long. You thus have a *hood* hanging in front of your chamber, whose length is the breadth of the calico, say 30 inches, attached to one end of the frame and bottom, and with an extensive mouth, into which you insert your head and arms, allowing the hood to come down nearly to the waist, and in this you work most conveniently.

By removing the shelf, slip E, and allowing the chamber to fold up, you will see how beautifully the whole subsides into the box—the ends folding on themselves, whilst the top goes down horizontally, the back puffing out behind; you then fold up this back, and also the hood into the box, shut up and hook the falling front, fold up the tressels of your table, put it over the open box, buckle your strap, and move off to your next station.

Of course your baths, bottles, &c. must be taken out before you shut up the chamber. I prefer carrying those with camera in a second box,—but, if thought more convenient, the five inches depth of the chamber box might be gained by bringing the end frames higher up, so as to give room for baths, &c. *under* the frames when closed.

M. ESMONDE WHITE.

NOTES ON DISHES, TENTS, &C.

SIR,—If "Photo. beyond Railways," vol. i. p. 299, were living anywhere in my neighbourhood, if I could I should be very glad to help him, but I am afraid it is not in my power to send lists (for your approbation) such as he mentions at p. 299; for although there are certain broad rules to be observed, such as conveying the whole and sole use and enjoyment of certain baths, dishes, funnels, &c., to hypo. solutions for ever, yet, when we have to descend to minutiæ, then the only rule I know is to trust to one's common sense; when this fails any one, they now have a sure remedy (as I know from experience) by writing to "THE NEWS;" but, let them first tax their own ingenuity and thoughts, for their future benefit and your relief. A slate pencil never occurred to me; when glass rods or tubes were not forthcoming, I turned to the bundles of reed in the loft; but it has now suggested to me the idea of slate baths, which I mean to try.

May I say a word or two of my experience in tents and similar contrivances? I have purchased and made six, and have well tried them all. I do not like those which are entered by an elastic or running string round the waist, as described at pages 190 and 284. Those similar in principle to the ones described at pages 179, 297, and 305, are not large enough for work, if made larger you can't reach from one end to the other; and, further, the moisture from within gets condensed in warm weather on the inside of the glasses, and then it prevents all view of the development of the picture. I have now discarded all but one, which is similar to that described at p. 10, and which was the first I had. I have a box which holds all the apparatus except the legs; this, too, forms a seat inside (when in use). The usual camera tops I found too close at the top, so I employed a blacksmith to make an equilateral triangle with joints at two corners and a screw at the third, so that it folds up together; the sides are 18 inches long; then a chimney, shaped like a magic lantern, to exclude light and to ventilate; so my field roll is simply—

Two stands and screws.
Box with—
    Camera and lens.
    Case of bottles.
    Focussing cloth and glass.
    Slide.
    Bath cover and dipper.
    Water cistern.
    Plate box and plates.
    Cleaning cloths and chamois.
Tent cover and top.

If you should deem this (which is, though, too long) or any part thereof worth publishing, it will be, my dear sir, from yours gratefully, H. S. I.

STEREOGRAPHY.

SIR,—Much has been said and written respecting the stereoscopic angle, and the point appears as far from settlement as ever. Having in stereoscopic work always taken my pictures on what may be called the parallel system, a note from the experience of a hard-working photographer may be useful to those who, like your correspondent J. W. W., wish for information on the subject. I commenced like many others by taking both pictures at once with a twin lens camera, but this, however correct in theory, did not give sufficient relief to satisfy customers, and I was told by cunning photographers that to give satisfaction I must either use one on parallel laths, or two cameras placed at a distance from each other,—in which latter case I must be careful to get the right angle. Neither remedy exactly suited me, and, thrown back on myself, I adopted the most simple of simple contrivances, which answers the purpose admirably: it consists merely of a piece of board, two feet long and the width of the camera, with a ledge ½ of an inch high, to prevent the camera slipping off, and marked with scale to show the distance of lenses from each other. The *modus operandi* is as follows: having screwed the board on the stand, the camera is placed on, and the view focussed; a glass $6\frac{3}{4} \times 3\frac{1}{4}$ is prepared, and the camera placed in position for the left-hand picture; the left cap is then to be removed, expose the necessary time, and then replace the cap; push the camera along the board to the position for the right-hand picture, take the right cap off, expose, put the right cap on, and remove the slide to operating tent. The time taken to cap the left, shift, and uncap the right lens is three seconds; at this time of year both pictures may be taken in 50 seconds,—as a proof of the result, I send you three specimens for inspection. Nothing can be cheaper, or more convenient, equally adapted for one lens or two, and the extra apparatus (or board rather) is such as can be fitted by any photographer—amateur or professional.

Campden. S. T.

MR. LYTE'S NEW GOLD TONING BATH.

SIR,—I have tried the new process of toning by Mr. Maxwell Lyte (vol. i. p. 301), and enclose you a print toned in less than five minutes: the whites are beautiful, compared with the old system. In printing, I found that a properly exposed paper toned the best. The change in the new bath is really magical. I, for one, must give Mr. Lyte great praise, in thus giving to the world his labours. I tried an underprinted positive, and was much gratified in seeing it change to a beautiful purple tone, and great vigour; but it required a longer time in the bath. J. B——N.

[Judging from the specimen sent by our correspondent, the toning bath above alluded to leaves scarcely anything to be desired.—ED.]

PROPOSED REGISTER OF VIEWS FOR PHOTOGRAPHERS.

SIR,—I have long wished to see a correspondence started in your columns, having for its object the collection of information as to which architectural subjects are photographically possible; say—Cathedrals: some are not at all possible; some are partially, others wholly, admitting several views. I and another amateur or two here wish to have a cathedral tour in the summer, but we don't know where to begin—100 or 200 miles might be traversed, and no view possible. Such a correspondence would be eagerly sought after by your readers, I humbly think, if it could be

started. One cannot take the opinion of others than Photographers, and they are few and far between.

I have bought lithographs and engravings, but I have learned to put no faith in them; the artists give splendid foregrounds, and acres of space, for which they have "drawn" upon their "fancy." The information need not be confined to cathedrals, the various railway lines might be alluded to, giving the architectural or other subjects on any given route, &c. W. W.

THE SUPPOSED "NEW ACTION OF LIGHT."

SIR,—I have just seen your observations on M. Niépce's discovery of "A New Action of Light," which certainly *appear* to establish the fact, that *actinism* has nothing to do with the effects produced by the experiments with tartaric acid, &c.; perhaps it may be of service to you in your future investigations if you were to use a mixture of solution of bichloride of mercury and oxalate of ammonia, in a glass tube, in place of the sensitive chloride of silver paper, as this solution, although as sensitive to actinism as Ag Cl, yet is not influenced by heat. I have tried the mixed solution in the tin tube, with a view to obtain a result with absorbed actinism, but was unable to do so. Perhaps your idea may account for my failures. ROBT. JOHN FOWLER.

13, *Briggate, Leeds.*

ANSWERS TO MINOR QUERIES.

DECOLORING COLLODION WITH METALLIC MERCURY.—*Chemicus*. In addition to the methods of decoloring old red collodion with metallic silver, cadmium, zinc, &c., we have found that metallic mercury will answer the purpose very well. The liquid nature of the metal, and its affinity for iodine, cause it to be well adapted to this purpose. A globule the size of a pea may be poured into a few ounces of collodion, and if briskly shaken for a few minutes, the metal will be diffused through the liquid in the form of an impalpable powder, which soon seizes upon every particle of free iodine present, whilst its great specific gravity causes it readily to sink, and leave the supernatant liquid clear.

CHEMICAL SYMBOLS.—*H. S. I.* In chemical symbols a + and *comma* do not mean the same thing: when + divides two compounds, it means that the two are separate and distinct; each possessing its own peculiar properties: when, however, the same bodies are separated by a comma (or, as we prefer, by a full stop), it means that they are united together chemically to form a third substance possessing new properties, in which the distinctive characteristics of the two from which it is produced are gone. Thus the equation—$3\,SO_3 + Fe_2\,O_3 = Fe_2\,O_3.\,3\,SO_3$ is not the same thing as the algebraical equation $a + b = b + a$; but it means, 3 parts of sulphuric acid SO_3, added to 1 part of sesquioxide of iron, will produce 1 part of sulphate of iron. On the one side we have a mechanical mixture, and on the other a chemical compound.

SPECIFIC GRAVITY.—*A Pupil* sees frequent references in our columns to the specific gravity of a substance, and asks how he can take the specific gravity of a body. Let us suppose that the substance in question is a piece of iron; hang it to the bottom of a scale pan by as fine a thread of unspun silk as will safely carry it, now weigh it accurately hanging in the air, and afterwards place a tumbler of water under it and see how much it weighs when the piece of metal is completely immersed in water. Then divide the weight in air by the difference between the air and water weighing, and the result will be the specific gravity. The following is a general formula, which will be found very useful:—

Let w = the weight of the substance in air
" w' = ... water.
$\therefore w - w'$ = the weight of a bulk of water equal to the bulk of the substance.
then $w - w' : w :: 1 :$ Sp. gr.
or Sp. gr. $= \dfrac{w}{w - w'}$

In very accurate experiments it is necessary to take many precautions, such as employing the water at a particular temperature (60°) &c, but these would belong more to the domain of the higher branches of chemical physics than photography, as in the latter science such extreme accuracy is seldom required.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

LUX.—We have continued the experiments mentioned in our last number, but have hardly yet brought them to a sufficient point for full publication. A piece of sensitive chloride of silver paper was stretched over the mouth of a test tube, in which some pure distilled water was kept boiling: in about two minutes the paper had darkened considerably, showing that *heat* (and perhaps aqueous vapour) was capable of exerting a similar action to actinism. We have since shown that aqueous vapour is not necessary, by fastening the sensitive paper round the outside of the test tube close to the glass: it darkened in this case also, though not so rapidly as in the former experiment. A third experiment was tried as follows:—A strip of thin printed paper (torn from a hand bill) was screwed close to a piece of sensitive chloride of silver paper in a pressure frame, the piece of hand bill serving as a negative. The frame was now exposed for some minutes to the heat from a vessel of boiling water, and the result was a reproduction of the paper used as a negative, but in *its true light and shade*. The negative had, in fact, facilitated the absorption of the heat instead of obstructing it. We are still anxiously pursuing this new development of photography, and will, ere long, lay the complete results before our readers.

P. F. P.—1. Query inserted in full. 2. The plate should be allowed to dry spontaneously; if the varnish be a spirit varnish it should be applied with heat, but if the solvent be chloroform or benzol it should be applied cold.

W. J. W——n.—There was not quite enough iodide of cadmium in your bath to begin with: you should have added about 5 grains. If the bath is still foggy, add one drop of nitric acid; and, if that will not cure it, sun it as recommended in previous numbers. We are much obliged for your receipt, and will insert it with pleasure.

ZINCIS.—Try the toning bath given in the last number, vol. i. p. 301. The other information will be found on reference to our advertising columns.

TROUBLESOME.—You cannot completely avoid the nebulous outline round objects, unless you use a good lens: it may be diminished by using a small aperture to the lens.

AN AMATEUR.—Your prints are very clean, and if the negatives had been developed longer they would have been very good. Try the toning bath at vol. i. p. 301.

ZETETIC.—Some other solution must have found its way into your silver bath, otherwise it could not have deposited a thick black precipitate in perfect darkness: most likely a little hypo. has found its way in, and in that case the precipitate would be sulphide of silver. Add a few grains of metallic cadmium, boil violently for some minutes, then filter, and add a few drops of acetic acid; that will most probably prove an effectual remedy.

S. AND H. PATEY.—Try some other variety of English photographic paper. It is quite a chance getting perfectly good paper at first, but a little experience in the different varieties will soon show you which is the most preferable for your purposes.

POSITIVE.—See answer to "An Amateur."

SELF-TAUGHT.—Filtering the collodion would prove an effectual remedy against the spots; but if it requires thinning afterwards, a mixture of four parts ether and one part alcohol, both perfectly pure, should be added: your fault consisted in not using pure ether. The remedy for your *colouring* difficulty has been pointed out in our "Lessons on Colouring." Acetic acid in a bath is less likely to cause insensitiveness and faintness than nitric acid, if used in rather too large quantities.

PYRO.—A great noise was made some time since about the new metal aluminium, and if it could be obtained at a small price it would be invaluable. As a substitute for brass work in the camera and lens fittings, its very low specific gravity and great strength would make its employment a great saving to travelling photographers; and even at its present price (about 7s. 6d. per ounce), it might not be too expensive for some amateur photographers.

M. WANE.—A print should not remain in the fixing bath for a less time than ten minutes or a quarter of an hour; indeed, a rather longer time would be preferable in cases where the bath did not enfeeble the print too much.

DESPERATA.—Rub the stains with a lump of cyanide of potassium dipped into water, and they will vanish.

E. H. F.—1. The lenses you name are excellent. 2. We do not know the exact proportions he uses, but should think 20 grains to the ounce would do. We are much obliged for the interesting communication on the stereoscope.

BETA.—1. Photographic instrument makers sell small eye-glasses for focussing with. We should recommend you to try one, as it might remedy the inconvenience you allude to. 2. See Mr. Doubleday's canvas tent, recently described.

A SUBSCRIBER FROM THE BEGINNING.—We do not at present know of a better plan, but are experimenting on the subject, and hope shortly to be able to give a different and superior process.

LEX.—The tin box should not be blackened inside. Was your box well cleaned out? Take six times as much Beaufoy's.

J. BROWN.—The only suggestion we can offer is, that the glasses were not properly cleaned.

G. C.—An ordinary spectacle lens is the one which is intended to be used.

J. B——n.—1. We will describe a plan in an early number. 2. They would not be so applicable to the wet collodion process as to the one there alluded to. 3. The one you call P. is the best. 4. They are not made of sufficiently short a focus. We are glad you like the toning bath: your print is excellent.

A HARDWORKING AND PRACTICAL AMATEUR.—Received with thanks.

Communications declined with thanks:—Brass.—Fix.—A. G. B.—Hypo.—C. S. L.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Chloride.—Asmodeus.—Dr. X.—S. Y. O.—H. P. R.—Hypo.—Eusebius.—A Photo.—Old Hypo.—Pitt.—C. O. A.

IN TYPE:—H. Bellini.—θ.—J. R.—W. Cochran.—C. Heisch.—P. P. P.—Suggestor.—R. H.—P.—D.—T.—X. P. R.—B.—A. N.—W. W.—A. R.

⁎ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 28.—*March* 18, 1859.

PHOTOGRAPHS AND THE "BOOK POST."

IT is not without some little degree of surprise that we read a letter addressed to us by "A London Firm," and which will be found in another column, on the subject of the "Book Post," and the regulation regarding Photographic Works. We are sure that all our readers will share that feeling when they learn, for the first time, that if they have hitherto sent photographs through the post, they have done so on sufferance only. The case is one of the utmost importance, and while the public mind is still agitated by the recent arbitrary regulation, now happily repealed, regarding the pre-payment of letters, it behoves photographers to look to their own interests, and see that they are put on an equal footing with other publishing trades. We have, hitherto, been accustomed to hear of, and see, so much liberality on the part of the Post Office authorities, that we cannot understand their availing themselves of the quibble "Photographs are not Books."

In the *British Postal Guide*, containing the chief public regulations of the Post Office, the following definition of "printed papers" occurs (as applied to foreign countries):—"This includes Parliamentary proceedings, books of every kind, whether printed, engraved, or lithographed, sheets of music, prints, and printed and engraved maps, with any binding, mounting, or covering (whether loose or attached), belonging to any book, &c., and any cases or rollers of prints, or of printed or engraved maps, together with book markers, pencils, pens, or other articles usually appertaining to any such book, &c., or necessary for safe transmission. But no such book, &c. (unless it be for Sardinia, in which case writing, not in the nature of a letter, is allowed), must contain any writing or manuscript mark of any sort, and no packet must exceed eighteen inches in length, width, or depth (except those addressed to Sardinia, Spain, the Balearic or Canary Islands, Tuscany, Parma, Modena, and the Austrian dominions, which must not exceed 24 inches), otherwise it will be detained, and sent to the Returned Letter Office charged with letter postage. To Spain or the Canary Islands, however, bound books cannot be sent; neither can prints, music, maps, nor drawings, unless they form a part of any publication included in a packet of printed papers." We have thought it desirable to extract at full length all that is said in reference to the "Book Post," and we can only say that there appears to us an omission of the word "Photographs." Why should engravings, maps, sheets of music, be more highly favoured than Photographs? Certainly it cannot be urged that "sun pictures" are among the "forbidden articles" alluded to in p. 21, where "the Postmasters are instructed not to receive any letter, &c., which there is good reason to believe contains anything likely to injure the contents of the mail-bags, or the person of any officer of the Post Office." We find that among the "forbidden articles" are razors, scissors, needles, knives, &c., &c., but no mention of Photographs.

We have read the letter of our correspondent carefully, and can only arrive at the conclusion that the excessive charges of which he complains are to be attributed to a misunderstanding on the part of some clerk, either in the postal service of this country or abroad, and that when the subject is fairly brought before the authorities of St. Martin's-le-Grand, they will at once give permission for photographs to circulate like other printed matter. It will be seen that, with the exception of one slight deviation from the postal regulations, our correspondent has complied with all that is laid down; and we hope that the question which has now been raised will not be allowed to drop until photographers are put on an equal footing with other publishers.

THE SENSITIVENESS OF CHLORIDE OF SILVER TO OBSCURE RADIATIONS.

[WE have great pleasure in laying the following interesting and important communication before our readers. The name of Mr. Spiller must be well known to all photographers; suffice it, therefore, for us to say that, having had the good fortune to be for many years one of his most intimate friends, we can put implicit confidence in the accuracy and care with which the experiments were performed, as well as the soundness of the deductions which he has drawn from them.—ED.]

March 12, 1859.

DEAR SIR,—I have read with much interest the several accounts in your journal of the experiments of M. Nièpce de St. Victor, by which he has been induced to attribute a new agency to sun light. These, together with your own remarks, and those of M. Chevreul, have persuaded me that many important conclusions will result from a fuller investigation of the subject; and inasmuch as it may be thought desirable to place on record any experimental contributions tending to throw light on this interesting question, I transmit the following facts for your consideration:—

Some years since, while engaged in photographic printing, I attempted to preserve for future use a few small sheets of sensitised chloride of silver paper by inserting them between the leaves of a printed book, and then putting them away in a dark closet, the shelves of which were also devoted to books. There they remained, forgotten, until an occasion for referring to the volume in which they were contained brought them again to remembrance; and when found, after an interval of at least a year, they presented a darkened appearance similar to that resulting from a prolonged but partial exposure to light as in their ordinary application. The printed characters on the pages with which they were in immediate contact were distinctly rendered on both sides of the prepared photographic sheets inclosed between them; while at the same time it should be stated that there was no evidence of this result being attributable to the direct passage of light *through* the printed leaves on either side, as in that case the impressions would certainly have been rendered somewhat obscure from the interference of the pages of type contiguous to those actually copied.

The specimen, which I inclose, bears on the prepared face of the paper a fac-simile of the type represented in bronze characters on an iridescent ground, of which perhaps pur-

ple is the prevailing colour, and is as distinctly legible as the original pages of the "Reports of the Juries on the Great Exhibition, 1851," from which it is copied, with exception, of course, of the direction of the reading being reversed. The other side of the paper, presenting but different shades of dark grey, is, from the want of contrast in colour, not so well marked, although it clearly informs us how certain materials for candle-making are purified by the "bleaching agency of sun light."

These results, obtained long since, induced me more recently to study the earlier phases in the change of which the foregoing is the ultimatum. Accordingly, about three months since, some squares of sensitive, albumenised, chloride of silver paper were introduced between the pages both of old and recently printed books. At present the change is not sufficiently advanced to infer more than that the process of transfer is slow under the existing circumstances, and that the darkening commences in contact with the printing ink, and not against the white paper—a result at variance with the supposition that the latter had absorbed by preference, and is now giving out, the active principle of sunlight. These facts, coupled with the observation that the oldest printed pages appear to be the easiest transcribed. constitute all that can safely be stated at present in respect to these remarkable phenomena; and whether they are due to the accelerated decomposition of the silver compounds in the sensitive paper by contact with the carbonaceous or oily matter of the printer's ink, or whether they must be attributed to an action of heat, as suggested by yourself in a recent issue of your journal, still remains, I think, for future experiments to elucidate.

I am, Dear Sir, yours faithfully,

Chemical Department, JOHN SPILLER.
Royal Arsenal, Woolwich.

PROPOSITION FOR EXCHANGING STEREOSCOPIC PICTURES.

ON the 8th of April we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures, with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed a picture be forwarded with it.

We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score.

The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

DRY AND WET COLLODION.

BY M. L'ABBÉ DESPRATS.

THE subject we are about to consider is one which presents considerable difficulties; under this head we might, in fact, include an elaborate essay on collodion, but our aim is scarcely so elevated; our intention being simply to point out certain facts, which have presented themselves in the course of the numerous experiments which our leisure hours have allowed us to make, and the conclusions which may be drawn from them.

Before going further, we may be allowed to make a few remarks on a question which still continues to occupy the attention of photographers, viz., dry collodion. We have seen, with great satisfaction, that the ideas we have published on this important subject during the last two years have attracted the attention of inquirers. Certain dry collodions have been introduced into commerce, which are no doubt excellent, but the formulæ for them are kept a profound secret. We don't complain of this; it is no affair of ours.

The strongest impulse given to photography in recent times is incontestably derived from the discovery of collodion. The admirable results obtained by the use of this valuable agent have excited the emulation of numbers. Its action, however, is capricious. An amateur sees, with surprise almost amounting to stupefaction, the beautiful negative he has obtained almost without any assistance from himself; and the next morning he exposes a plate in the expectation that he is going to obtain an equally good result, and is both surprised and vexed that he does not. The sun may be as bright, the atmosphere as transparent, and his chemicals appear in equally good order; nevertheless his negative is an indifferent one, and so possibly are many succeeding ones. He does not know the reason of this, and possibly it may arise from different causes, but, unquestionably, the chief cause of failure is in the faulty composition of the collodion. If we may affirm that with a good collodion, sensitised in a good bath, a fair picture must necessarily follow, we may also say that, without these two conditions, the most able master in the art would be unable to raise himself above the level of the humblest beginner.

It is not our intention to enumerate here the different formulæ which have been successively published. All have their relative value, and all may be capable of yielding imperfect results, however carefully they may have been practised. The failure in this case has its origin in the impurity of the products used. How can we judge *à priori* of the good qualities of these? Science is on this point undoubtedly of great service; but every patient and careful observer may often supply its place by experience. The following observations may save many beginners from disappointments.

The bodies which enter into the composition of photographic collodion should be divided into two perfectly distinct series, viz.:—bodies compounded in clearly defined proportions, as bromides, iodides, &c., and those which, like alcohol and ether, admit of the forcible or accidental introduction of foreign matters into their composition, the effect of which is to modify more or less their proper and essential characters. To this latter series attaches a third body, gun-cotton, a substance as yet but imperfectly studied, a combination of bodies in variable proportions, and especially variable by reason of the presence of foreign bodies, which adhere to it with a great and prejudicial obstinacy.

With respect to the different iodides and bromides we have nothing to say; they may generally be obtained in commerce in a proper degree of purity; but the same cannot be said of either alcohol or ether, and more especially of gun-cotton. Of these three bodies, alcohol alone is obtained more frequently than the others in the state of purity which is absolutely essential. Nevertheless it is commonly associated with a varying quantity of water, but as the means employed in rectifying it in no way alter its nature, this product may be brought into excellent condition. Let us remark, however, on this subject, that absolute acohol is in no way necessary to the maker of collodion. Alcohol is the principal solvent of the iodides, and it would accomplish this but very imperfectly if it were anhydrous. In commerce we meet with several varieties of alcohol, but as far as the photographer is concerned there is only one in reality. The aroma which distinguishes them is too slight, too imponderable for it to exercise any notable influence on the effects to be obtained. We constantly use with equal success alcohols derived from all sources, whether obtained by the fermenta-

tion of wine or any kind of grain. We repeat, their principal quality depends on the degree of rectification to which the spirit is submitted. We shall find it necessary to return to this point further on, as it is one of some importance in the preparation of collodion.

The ether employed in photography is the result of a decomposition of alcohol by means of sulphuric acid; it is not therefore a natural product. It may by chance contain acid, in which case it must be rejected. It should therefore be ascertained by means of some sensitive re-agent, an infusion of red cabbage for example, that on this score it is without mixture. Sometimes, the acid reaction, which is masked by the vendor by means of an alkali, may change to an alkaline reaction; in this case the use of such an ether would be very bad indeed.

Finally, an ether which presents neither an acid or an alkaline reaction, and yet yields, nevertheless, but indifferent results, must be abandoned, and recourse had to another source of supply, until a good one is found, when it will be advisable to adhere to it. . . . . .

And now for a few words on gun-cotton: its preparation offers no real difficulties; it only requires the most scrupulous care, such as manufacturers do not always bestow upon it. It has been advised, and with reason, to submit the gun-cotton to abundant washings, first with cold water, and afterwards with hot, in order to remove every trace of sulphuric acid which may adhere to it. But the gun-cotton, on its removal from the mixture which produced it, contains not only sulphuric acid; it contains also a large quantity of sulphate of potash, a very insoluble salt, crystallised and strongly agglomerated between the fibres of the cotton, from which it is extremely difficult to separate it entirely, and which can only be accomplished with certainty by repeated washings, during several hours, under a good stream of water. If it be desired to obtain palpable evidence of the freedom of the water used in the later washings from all salt or acid, it is only necessary to pour into it a few drops of a solution of chloride of barium; if the water be troubled, it contains one or both of these substances, most probably the former.

Perfectly washed and dried gun-cotton can undoubtedly be preserved in a well-closed bottle. For our part we preserve it rolled up in several sheets of blotting paper in a very dry place. We happened to see in the possession of M. Durand, a distinguished photographer of Lyons, a specimen of gun-cotton, which had been supplied to him by a Paris house; and the examination of this specimen surprised us not a little. Having removed the cork which closed the bottle, we remarked that this cork was stained of a yellow colour, and corroded as if it had been exposed to the emanations from nitric acid; the cotton itself had the consistency and appearance of yellow paste; it was deliquescent, and gave forth a strong odour of deutoxide of nitrogen. M. Durand assured us that this was not the first time he had observed such a change, that it took place after the lapse of a very short time, and only yielded good results for a short time after he received it. We cannot assign the cause of such a deterioration; but we think there can be no doubt that greater care in its preparation would have prevented it; and we can affirm, from our own experience, that gun-cotton prepared with the same care as that which we employed will remain equally good, and without any real or apparent alteration, for an indefinite period.

It is not very long since M. Gaudin advised the manufacture of collodion from saw-dust. He thought possibly that by this means greater sensibility might be obtained. We had the idea of preparing pyroxiline from the silky down of thistle-down, and we obtained a yellow product of a feeble deflagration, and very slightly soluble in a mixture of alcohol and ether; but which, we may observe, notwithstanding its strongly shaded tint, was one of the best we ever made; it yielded, in particular, most admirable half-tones, but, as far as we remember, we did not remark any augmentation of sensitiveness.

Since we wrote the above nearly twelve months have elapsed; and since that time no very notable discovery has been made in this interesting branch of photography. It must be admitted, that this branch approaches very closely to perfection, if it has not already obtained it.

(To be continued.)

MICRO-PHOTOGRAPHY.

Dr. Müller speaks of a micro-photograph which had been shown to him, which was scarcely perceptible to the naked eye but as a faint spot on the glass; but which, on being looked at through a microscope was seen to be a full length portrait of the Emperor Napoleon III., in a military costume. We have seen another which represented the well known picture of the Queen and twelve naval officers in council; every feature of each individual being perfectly distinct on the application of a microscope of rather high magnifying power; although a threepenny-piece would have covered the entire photograph and something more. Mr. Alfred Reeves has recently forwarded to us a specimen of one of these minute pictures, which consists of a plate containing the portraits of the kings and queens of England since the time of the Conquest. Here, on a space not larger than the $\frac{1}{16}$ of an inch square, may be perceived a miniature "National Portrait Gallery" with a portrait of every king and queen surrounding her Majesty, who is properly made the centre figure of the interesting group. We have already referred on a previous occasion to some of the uses to which micro-photography might be put, but there are some others which we may briefly notice. Suppose, for example, that two portions of the same army are encamped at a distance of one or two miles apart, the communication being cut off by the enemy, or rendered almost impossible by the use of "arms of precision;" a very simple arrangement would enable the fullest written despatches to pass from one portion of this army to the other, without risk, and almost with the rapidity of electricity. The despatch is written, and a micro-photograph taken which reduces it within the limits of—if a long one—a square inch. This is placed inside one of the hollow conical bullets and the end closed with lead. The hoisting of a given signal would announce that a messenger was about to be despatched; and with the accuracy which distinguishes our improved rifles, a commander might have his despatches delivered with a speed and punctuality to which no post-office has yet attained. In the case of a beleaguered town, too, such a method of communication between its inhabitants and an army approaching to relieve it might be invaluable. It has not the drawback either of requiring men to have a special training for the purpose of carrying on these communications; all the manipulations necessary might be learnt in less than a week. Neither would there be any necessity for using a cipher, as there would be no risk of the despatch falling into the hands of the enemy, and hence there would be less chance of misapprehension of instructions than exists at present.

POSITIVE PRINTING.

Since the insertion of my short notice on this subject at vol. i. p. 86, I have had many communications requesting me to go into the detail, as numerous beginners could not gather from that all the information required to make a good photographic printer out of a perfect novice. In compliance with these requests I now proceed to give all the aid that I can.

The first thing required is a good paper, and as to this I can do little but repeat my former opinion.

To Albumenise.—Take any quantity of the whites of eggs not more than three or four days old, take away the germ and to each ounce add ½ ounce of water and 12 grains chloride of ammonium, or common salt, as I find little differ-

ence betwixt the results. Dissolve the salt or chloride in the water before adding it to the albumen, and then beat up the whole for 15 or 20 minutes. I think the best way of beating the liquid is to get a handful of *small* well-washed gravel, and having put it with the albumen in a strong bottle (which must not be more than half filled), shake about violently for the above-named time; this method is very effective, and does away with the chance of uneven and streaky paper. The most common cause of albumenised paper not being uniformly coated is, that the albumen has not been sufficiently beaten, and consequently cannot flow off it evenly. The papers being cut to the required size, pour the prepared albumen through coarse muslin into the dish, and so you will get rid of the bubbles, and let it be $\frac{1}{4}$ of an inch deep at least; take the sheets and fold over one corner for half an inch, so that this piece will not come into contact with the liquid; then holding this corner in the left hand, let the opposite corner touch the albumen, and lower the top gradually whilst you pass the right hand lightly up the back, and so insure it touching the surface, there let it rest three minutes; if any air-bubbles appear on the surface they must be removed, as they would certainly cause streaks. After the above time, lift it by the folded corner and let it drain about a minute, then suspend it by the same corner, and having placed a very small bit of blotting paper for the albumen to drop off by, leave it about twelve hours to dry. Before putting it into the portfolio to keep, it should be thoroughly dried by the fire.

To **excite** this paper, float no less than five minutes upon the silver bath made by dissolving 60 grains of crystallised nitrate of silver in 1 ounce of distilled water, adding 8 or 10 drops of acetic acid. This bath should be not less than $\frac{1}{4}$ inch deep, and when fresh silver solution is added to it, the strength of this additional quantity should be 70 or 80 grains to the ounce of distilled water, with 8 or 10 drops of acetic acid. The bath will be thus kept about its original strength, and so the prints will be vigorous, that would else be meagre and poor, without any boldness and decision. The very darkest shades, if the paper be good, will readily become bronzed when printing in the sun.

Here the operator must be told that, after being used a short time, the silver bath will grow discolored; this will not injure the paper until the liquid is almost black; then the operator may get about a drachm of kaolin, and mixing this with 4 or 5 ounces of the bath, violently agitate the bottle and leave it in the daylight a few hours, and then filter; this will restore it to perfect brightness. Another method of keeping the bath clear is to add to it about $\frac{1}{8}$ of its bulk of alcohol, by which means some operators affirm no discoloring ever takes place, but I have never used this myself.

Of course, after excitement, the paper must be hung up in the dark until dry; when dry, if kept away from the light and air, it will keep very well for a week. I myself, after hanging it up in the dark room until dry, put the sheets together betwixt blotting paper, and so into an old letter book into the copying press, as if being copied, and press it very tightly; in this way I can keep the sheets rather more than a week.

The exposure must be prolonged until the picture is darker than it is wished to appear when finished; as every sun-printing process becomes considerably lighter in fixing and toning. As soon as the sheet is taken out of the frame it should be immersed, and left an hour or two, in a large vessel of water to remove the free nitrate of silver from it, and then if the operator wishes to keep the sheet until he gets a quantity to tone and fix at once (which I always do), he can hang it up in a *dark* room for two or three days safely.

To tone and fix.—In a room where there is no more light than is necessary to watch the changes of colour, put your prints, after the before-mentioned washing, into a dish of water, to every ounce of which two or three drops of strong liquid ammonia have been added. Make a solution of chloride of gold of the strength of one grain to about 6 ounces, and add 20 or 30 grains of carbonate of soda. To make this solution, as I before recommended, it is best to dissolve 15 grains of chloride of gold, as it is sold in this quantity, in 15 drachms of water; then the amount of gold can be easily measured, as each drachm contains one grain of gold. After the print has been in the ammonia and water two or three minutes, immerse a few seconds in water, and immediately put into the gold bath; keep moving it about, and in some time between one and five minutes it will gradually change to a blue black; remove and immerse again about half a minute in water, and then into the fixing bath for fifteen minutes. The fixing solution is made by dissolving one ounce of hyposulphite of soda in six ounces of water.

I always think it safer to use a small quantity of this bath fresh each day on which I tone and fix a quantity of prints, as I always distrust hyposulphite solution which has been used before. After fixing, the pictures should be washed 24 or 36 hours, changing the water eight or ten times. Many of our high authorities recommend a much shorter washing than this; but, as has been before advised, let any man try to wash a piece of paper free from some coloured salt with which it has been deeply coloured, and although the salt may be a very soluble one, he will find that it is far more obstinate than he before imagined.

This, I think, is all that the beginner in photography need be told to give him as much aid in the printing process as words can; and here let me state my experience as to a movement there seems to be towards new applications of gold, and new mixtures in the gold-toning baths. I do not hesitate to say that most of these are very troublesome to concoct, some of them requiring to be kept at a certain temperature whilst being used, which is often no small inconvenience, and many of them (as the late French one) very expensive,—and what is the advantage in using them? My experience convinces me that not one of these methods is an advance in certainty, or good result. No process clears the whites, and yet does its work as to colour, like the simple alkaline chloride of gold; and some first-rate men of my acquaintance have returned to the above, after using the new methods for a short time. Again, as I stated before, it appears very plain to me that no acid should ever be applied to a print after it leaves the [illegible]; and if a print is properly toned, fixed, and [illegible], my belief is that it is permanent *if kept dry and free from injurious gases.* Developed prints, I think, are really permanent, if properly executed; and if a good process of this kind were invented, it would be no small boon to photographers. Perhaps I may give my experience in this branch very soon, as I have long been engaged experimenting, —but this communication is simply in answer to those who wished a more minute description of the mode of printing mentioned at p. 86 in the first volume of the "Photographic News." Θ.

PHOTOGRAPHY IN THE SEVENTEENTH CENTURY.

"At the same epoch an utopian, Thiphaigne de la Roche, discovered photography, not the photography of the present time, but that of the future, photography which reproduced colours as well as images; a perfected photography, in a word, such as will be discovered to-morrow, or in the course of a century. The description of the apparatus given by Thiphaigne is rather long, but it is too curious for me to resist the temptation to cite it at length:—

"'You know that the rays of light reflected from different bodies form a picture and paint these bodies on all polished surfaces, for example, on the retina of the eye, on water, on glass, &c. Elemental minds have sought to fix these fugitive images; they have composed a very subtle matter, very viscous, and which dries and hardens rapidly, by means of which a painting is made in the twinkling of an eye. They coat with this matter a piece of canvas, and present it towards the objects they desire to have depicted. The first

effect of the canvas is that of the mirror, you see upon it reflections of all objects, far and near, from which the rays of light are reflected on its surface.

"'But that which a glass could not do, the canvas, by means of its viscous coating, can, viz., retain the phantom pictures. The mirror gives you a faithful rendering of objects, but retains none; our canvas renders them not less faithfully, and preserves them all. This impression of the images is the affair of a moment. The canvas is at once removed into a dark place and in one hour the sensitive film is hard, and you have a painting so much the more precious that no art can imitate its exactness. We take in the purest source, in the body of light, the colours which painters derive from different materials, which time never fails to change. The precision of the design, the variety of the expression, the touches more or less deep, the gradation of tones, the rules of perspective, we leave entirely to nature, which, with that steady progress which is its never-failing characteristic, traces on the canvas images which deceive the eyes, and makes reason doubt whether those things which we term realities are not another kind of phantoms which deceive the eyes, the ears, the touch, and all the senses at the same time.'"

The above extract is quoted from a work published by M. Edouard Fournier, entitled *Le Vieux Neuf*, and is said to have been written so long ago as 1670. We have no desire to wound the susceptibility of M. Fournier, but we must say that, without seeing the original MS. of 1670, we find it very difficult to convince ourselves that the art of photography existed in such perfection at that date. It is absolutely impossible to believe that the knowledge of such a wonderful art would have been suffered to die away, especially as the date when it is said to have been practised is comparatively recent, and hundreds of volumes of books, written at and long previous to that date, still exist, none of which make any mention of it.

THE PRODUCTION OF PHOTOGRAPHS WITHOUT THE AID OF LIGHT.

In quoting our observations on M. Niépce's discovery of a New Action of Light, the Abbé Moigno adds that it is evident we have wrongly interpreted our experiment, and have erroneously concluded that in M. Niépce's tubes it is not the light which acts. We must remark, that we carefully abstained from saying that it was not the light which produced the effect in that gentleman's experiment. We confined ourselves to stating the result we had ourselves obtained, with which, as we showed clearly enough, light had nothing whatever to do. He further asks, What our experiments prove? and goes on to answer that—"*heat* in the tube produced the same effects that M. Niépce attributed to light. Nothing more or less. Now, this is only what one might—nay, what one could not help foreseeing, after the communications made to the Editor of the 'PHOTOGRAPHIC NEWS' by Professor Wheatstone." We need scarcely say, that we claimed no credit for such a simple experiment as the one we made; but we may observe that we did not prepare the paper in the manner in which M. Niépce prepared it for his experiments in reproducing pictures by means of radiant heat; also, that had such a minute description of the mode of preparing the tube previous to placing it over the negative been published, at the time we had the honour of receiving the communication from M. Niépce on the subject, some twelve months ago, we should have tried the same experiment then.

We do not pretend to pronounce an authoritative opinion as to the cause which produces the action on the sensitive paper; we have merely shown that heat, with or without moisture, will produce this effect, and that if we employ the heat from boiling water, in which no tartaric acid is contained, we obtain the same effect; and we, therefore, conceive that it is more reasonable to conclude that this effect arises in M. Niépce's case from a similar cause, than to attribute it to a property of light which, if it existed, would go far to prove that the Newtonian suggestion of the possible nature of light, recently brought forward by Mr. Grove, had some foundation in fact.

PHOTOGRAPHS IN NATURAL COLOURS.

A CORRESPONDENT writes to say that he is in possession of a method whereby the natural colour of objects can be fixed by the aid of photography.

Before publishing his discovery, however, he is anxious to know whether any other photographer has turned his attention to this subject, and if so, whether any success has been obtained. If within six weeks we do not receive a reply to this, our correspondent has promised to go through the whole process in our presence; his object in this is, to prevent the possibility at any future time of any one claiming the priority of discovery.

We have simply quoted the letter of our correspondent, but with regard to the actual result producible by the alleged discovery, we are quite as much in the dark as our readers.

Critical Notices.

Stereograms. By E. S. NEWCOMBE.

THESE ruins are produced by a dry process described in p. 130, vol. i. It is a process respecting which we have lately had several questions asked, and, from an examination of these pictures, we have no hesitation in recommending it to the use of our readers. One of our contemporaries has advertised the process as being a new American one, but our correspondent has used it for several years. The stereograms possess all the requisites of good photographs by clearness, definiteness, and minuteness of detail. The picture of "Bishop Stafford's Monument," Exeter Cathedral, is a very fine specimen of interior photography.

Lessons on Colouring Photographs.

COLOURING IN OIL—*(continued).*

BEFORE proceeding further it may be desirable to explain a few technicalities descriptive of processes or modes of operating in the use of oil colours.

Glazing is the application of a thin, transparent film of colour, for the purpose of modifying the tone of another colour already applied. It is generally used to give depth and richness to shadows; or, sometimes, to modify or subdue lights, giving them warmth or coldness as may be desired. As this is a process much used in colouring photographs, it is important to the beginner to understand it. Glazing is generally effected by the application of transparent colours diluted with megilp; semi-transparent pigments may also occasionally be used, but will require to be much diluted. Much greater depth and transparency in shadows, and richness in many colours, is obtained by painting a little brighter than is desired in the first instance, and subsequently glazing to the requisite tone, than can be easily obtained by any other method. In colouring photographs it will often happen that but little is required in the shadows beyond modifying their tone or depth by glazing.

Scumbling is a somewhat similar process with an opposite purpose. It is the application of opaque colours, or colours rendered opaque by admixture with white, for the purpose of making the objects to which it is applied cooler and less defined. It is rarely required in colouring photographs, except in landscape backgrounds, where it may be used to give atmosphere and distance to objects which appear too prominent.

Impasting is the application on the lights of the picture of opaque colour in a thick, solid body. In colouring photographs its chief use will be to give brilliancy to jewellery by the mechanical relief of the impasted colour.

First-painting.—The material ready, and the photograph prepared, commence by colouring the face. For this pur-

pose lay the palette with the following colours: white and Naples yellow; white, Naples yellow, and extract of vermilion; white, Naples yellow, and light red, for the lights and local colour. For the half-tints use white and terra verte; white, terra verte, and Indian red; white and Indian red; and light red and burnt umber. For the carnations: white, pink, madder, and vermilion. For the novice, especially, it will be well to keep the colours well thinned with megilp. Commence by glazing the shadows with a warm tint. Remember that the tone of the photograph and the complexion of the sitter will materially modify the choice and preparation of colours. In many cases, a mixture of light red and burnt umber will be suitable for the first glazing of the deepest shadows; for the next gradation of shadows use terra verte and Indian red; and for the pearly tints, white and terra verte. For the high lights, white and Naples yellow, with occasionally a little pink madder, will be required; these must be used without much thinning, so as to obtain a good body. They should be applied with as much accuracy as possible at once, as their brilliancy and freshness will be injured by much working with the pencil. Graduate gently from the high lights to the local colour, and blend this softly with the shadows, using grey tints for the purpose. The lines about the mouth, nostrils, and eyelids may be strengthened with Vandyke brown and pink madder.

In addition to the colours we have named for the first-painting, some tints for hair will require adding to the pallette. For the various tints of light and brown hair, the following will suffice: white, Naples yellow, yellow ochre, Vandyke brown, and raw umber. For dark hair: black, lake, Vandyke brown, brown madder, cobalt, and white. These tints properly mixed will suffice for hair of almost any colour.

The tints we have described having been applied to the face, the hair will next receive attention, keeping as a general rule the lights cold and the shadows warm. Avoid hardness where the hair joins the forehead and temples, using greys to blend them.

The iris of the eye may be coloured with Vandyke brown, burnt sienna, indigo, or cobalt, as the natural colour may require. The lips may be coloured with vermilion and pink madder, keeping the upper lip, which is in shadow, low in tone. The hands should now receive their local colour.

The draperies may be commenced by glazing the whole with an appropriate colour, on which the lights and shadows will be subsequently strengthened; of the most suitable colours we shall speak hereafter.

The background may be commenced, keeping it somewhat lighter than is intended; the choice of colour, of course, depending on the complexion of the sitter.

When the first-painting is completed, the picture must be put carefully away where it will be free from dust, until it is dry; the time required will vary with the temperature and nature of the vehicles used; but the second colouring should in no case be commenced until the first is thoroughly dry.

(To be continued.)

Photographic Chemistry.

ANALYSIS OF SILVER BATHS—*(continued)*.

Analysis by Weight.—The method above described cannot be employed for baths containing cyanide of potassium or hyposulphite of soda; nor, indeed, for any liquids which are very poor in silver. If the bath contains either of the two first-mentioned substances, no precipitate will be thrown down; and when liquids contain very little silver, it is better to weigh the chloride and deduct the quantity of the metal. We need scarcely point out that this mode of analysis is applicable to all silver assays.

Take a quart of the weak solution, previously filtered, and add to this hydrosulphate of ammonia by slow degrees until the solution acquires a strong permanent odour; the silver will be precipitated, and when this is completed the clear supernatant liquor must be poured off gently, and the sulphite of silver which remains emptied into a porcelain capsule, and the particles which may adhere to the sides rinsed out by means of a little distilled water and added to the contents of the capsule; to this a little aqua-regia must be added, and the whole submitted to the action of a gentle heat—care being taken not to let the liquid boil. If the precipitate does not become quite white, a little more aqua-regia must be added. Then evaporate to dryness, and heat the capsule until the chloride of silver is fused. Then weigh the capsule, and the difference between its present weight and its weight previous to the operation, when empty, will give the weight of the chloride of silver it contains. A little calculation will then suffice to give the exact value of the residue. The chloride will be found to adhere very closely to the bottom of the capsule; it may be detached by pouring on it a few drops of water acidulated with sulphuric acid and touching it with a bit of zinc, or a small fragment of the latter metal may be dropped into the vessel, and the ingot will speedily free itself from its close contact with the capsule. The strictest care must be taken in weighing the substances in this and similar operations, and the scales must be adjusted with such extreme nicety as to turn under the weight of a very small fraction of a grain.

Assay of Bar Silver.—The assay of silver in bars is an extremely simple operation. Suppose it is desired to test the amount of pure silver contained in a mass of metal: a small piece is cut off and carefully weighed, and then dissolved in an excess of nitric acid, then, add to this solution salted water, or hydrochloric acid; the silver will be immediately precipitated in the form of a chloride, while the copper will remain in solution; the chloride must then be washed by one of the methods we have pointed out, and as soon as the water used in these repeated washings ceases to assume a blue tint on the addition of a few drops of ammonia, or a brown tint from the addition of a few drops of ferrocyanide of potassium, the chloride is placed in a porcelain capsule, the weight of which is rigorously ascertained beforehand, and evaporated to dryness; the remainder of the manipulations being the same as those described above.

If the washing has been performed in a filter, it must be allowed to drain until nothing further runs from it, and then dried in a pipkin by the application of a gentle heat; after which the precipitate should be emptied into a capsule and the filter burnt over it, and the ashes of the paper added to the precipitate, with a drop of aqua-regia, and then calcined. The scales will determine the weight of the chloride of silver, and an easy calculation will give the weight of pure silver.

(To be continued.)

Dictionary of Photography.

CALOTYPE.—The name applied by Mr. Fox Talbot to the photogenic process on paper, published by him in 1839. Since the date of his patent it has been materially modified by various experimentalists, but the principle of the discovery, which consists in forming a surface of iodide of silver, rendered sensitive by an excess of nitrate of silver, and then, after impressing upon it a *latent* image developing this by a reducing agent, has remained untouched.

CAMERA.—The camera obscura was invented by Baptista Porta, of Padua, in the sixteenth century. This philosopher observed that, in a darkened room, illuminated only by a small opening, objects outside the room, in front of the opening, were depicted in an inverted position, on the opposite wall, in their true colours. The photographic camera, whatever be its shape, is an application of this discovery of Porta. It is a box, formed of wood, leather,

cloth, &c., and only admitting light through an orifice to which the *lens* is fitted; the side opposite to the lens is closed by the ground glass (a screen on which the objects are seen, and which is replaced by the sensitive surface when a picture is to be taken). The camera is so made that it is easy to vary the distance between the lens and ground glass so as to obtain that distance at which the image is most sharp, and which varies according to the focus of the lens and the distance of the objects to be copied. The camera and the lens should unite many conditions which it is difficult to obtain simultaneously:—Immobility when once fixed, even when of large size; lightness; and a sufficiently small bulk to allow it to be easily carried; and very simple mechanical adjustments, to admit of its being promptly erected and taken down. These conditions are especially necessary for cameras intended for travelling purposes. There are few plans in existence which satisfy all these conditions properly; and it will still be necessary for our instrument makers to continue their endeavours to diminish the weight and bulk of these instruments, without injury to their stability. For our own part, we prefer an expanding camera with an accordion body.

CAMPHOR.—A concrete essential oil obtained from various species of *laurus*, especially *laurus camphora*. These trees grow at Japan, Borneo, and Sumatra; and it is at Japan that the greater part of the camphor of commerce is prepared. Purified camphor is met with as a solid white transparent mass, possessing a peculiar and strong odour and taste. By [illegible]cooling of a warm saturated alcoholic solution, or by [illegible]densation of its vapour, camphor crystallises in octo-[illegible] It may be scratched by the nail, is rather flexible, [illegible] only be reduced to powder after being mixed with [illegible] alcohol. It is not altered by air and light, and is [illegible]flammable, burning with a luminous, smoky flame. Camphor is only slightly soluble in water—1 part requiring about 1,000 of water, to which, however, it communicates its peculiar taste and smell. It dissolves easily in alcohol—10 parts of the latter being able to dissolve about 12 of camphor: it is also very soluble in ether. Camphor is a very powerful antiseptic agent, and is of great use in photography in preserving solutions of organic substances—such as gelatine, gum, albumen, &c.—against decomposition; a piece about the size of a pea will preserve several ounces of these liquids from change for many months.

CANADA BALSAM.—The nearly colourless liquid resin of the *pinus balsamea*. It is employed for cementing together the component glasses of an achromatic lens, and also for mounting microscopic objects under thin glass. It may be considered a natural varnish, being a solution of resin in a volatile oil. It has a pleasant odour, and varies very much in consistency according to the amount of either of the constituents; if too thick for use, it may be thinned with a little spirits of turpentine.

(*To be continued.*)

A Catechism of Photography.

PRINTING POSITIVES.

Q. Are not the processes of photography which have been here detailed, all, or nearly all, negative?

A. They are; but from such negatives any number of positive impressions may be readily obtained. The negative photograph bears the same relation to the positive as the engraved plate does to the impression taken from it.

Q. Is the process of obtaining positives from negatives difficult?

A. It is not; nothing can be simpler than the methods which are generally employed; the only difficulty is, allowing sufficient time for the printing of the positive, and in the careful washing to which each proof must be afterwards subjected. Practice only can make an operator skilful in this branch of photography.

Q. What is the usual mode of obtaining positive impressions from negative photographs?

A. There are two methods of photographic printing: that which is generally employed consists in allowing the chemical action of light on salts of silver to produce the picture. This process gives the happiest tones and the richest effects, but it requires a strong light, and being more dependent on the direct action of the sun's rays, cannot, with equal certainty, be always employed. The other consists in exposing the negative on the prepared positive paper for a few seconds only to the action of light, and subsequently developing the image by the application of nitrate of silver and gallic acid. The modifications of this plan are very numerous, and by it very excellent results have been obtained.

PRINTING POSITIVE PROOFS BY THE ACTION OF LIGHT.—PAPER.

Q. What sort of paper is the best adapted for taking positive proofs?

A. A good even-textured paper, transparent and free from spots, is essential, as quite as much depends on the quality of the positive as the negative paper. Many photographers prefer the Saxony paper to any other; it takes good impressions either plain or albumenised. But the great thing for every photographer is to pick out that paper in which black specks or blemishes of any sort do not appear, as it often happens that paper with the best reputation is anything but free from defects.

THE CHLORIDE BATH.

Q. What is the first step in the preparation of the positive paper?

A. Floating it on the chloride bath; this is done by taking the paper, cut to the requisite size, by two corners, and laying it gently on the surface of the bath.

Q. What soluble chloride is employed for this purpose?

A. Various chlorides are used; chloride of sodium (common salt), of ammonium, of potassium, of barium, of strontium, &c. The species of chloride is unimportant, the result being the same in all cases. Chloride of sodium is very commonly used; chloride of ammonium is preferred by some operators, and is certainly of more uniform strength and purity than common salt.

Q. In what proportion is the chloride bath prepared?

A. In the proportion of four parts of chloride of ammonium to 100 parts of filtered water.

Q. Is not a small quantity of gelatine occasionally added?

A. It is; for instance, in twenty ounces of water we may put twenty grains of gelatine. When this is done a portion of the water must be heated sufficiently to dissolve the gelatine. The solution must be afterwards filtered through paper.

Q. What length of time should the paper be allowed to remain in the chloride bath?

A. About five minutes; they must then be carefully removed, so as to have no air-bubbles, and suspended by one corner to dry; mark the prepared side, so that it may at once be known; and the paper may be kept any length of time.

ALBUMENISED PAPER.

Q. Is not albumenised paper recommended as an excellent surface for the taking of positive photographs?

A. It is; the process of albumenising the paper is exceedingly simple. The bath should be prepared in the following proportions:—

Albumen	8 ounces.
Water	4 ounces.
Gelatine	12 grains.
Chloride of ammonium	120 grains.

The albumen must be beaten up into a stiff froth; it must afterwards be decanted, and be allowed to clear itself by subsidence.

Q. How is the albumen to be applied?

A. A portion of it should be poured into a flat dish, and

the paper floated for about a minute on the top, it should then be drained and pinned up to dry.

Q. How long a time will albumenised paper keep good?

A. Any length of time in a dry place.

SENSITISING THE PAPER.

Q. How is paper prepared in the chloride bath rendered sensitive to light?

A. By floating the paper so prepared in a bath of nitrate of silver.

Q. In what proportions should the nitrate bath be prepared?

A. In the proportion of 15 parts of crystallised nitrate of silver to 100 parts of distilled water. If the solution is not perfectly clear, it should be filtered.

Q. How is the paper to be sensitised in the bath?

A. By being laid on the surface of the solution so as to bring the side already prepared with the chloride in immediate contact with the liquid. Three or four minutes is the usual time necessary for sensitising the paper, after which it must be carefully removed and hung up to dry.

(*To be continued.*)

Correspondence.

PHOTOGRAPHS AND THE "BOOK POST."

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—We beg to call your attention to a fact in connection with the transmission of photographs by post. As the question is one of importance to publishing houses similar to our own, we hope that you will use your influence in procuring for photographers, and photographic publishers, equal rights with those of book publishers.

We have been in the habit now for some time, indeed ever since the introduction of that great public boon, the "book post," of sending photographs to our customers by that means, not only in England but on the Continent. We were well aware that if the ends of the parcel were closed that it would be charged for by *letter postage*, and that if the parcels were not prepaid they would be returned to the sender. Very recently we sent into Switzerland two photographs, the value of which was about ten shillings. The parcel was done up in the usual manner on a roller, and within the regulation size, and then posted. By an oversight, however, our clerk made a mistake in the postal charges, and put too few stamps on. The consequence was that, when the party to whom it was addressed received it, there was a charge of nearly *two pounds* sterling on it; the authorities at the post-office having charged for it by *letter postage*. The party paid this excessive charge, and immediately wrote us. We made every inquiry and then addressed a letter to Mr. Rowland Hill, the secretary of the post-office, inclosing the wrapper (which had been returned to us) of the parcel, and asking for an inquiry and explanation. In the course of a few days we received an official communication stating that every inquiry had been made; and that *one* of the reasons for charging so excessively was because the full postage was not paid; the *other* was that "*photographs were not books*," and as a consequence could not be sent under the "book-post regulation." Having stated in as few words as possible our case—one which will no doubt astonish many publishers—we ask you to use your powerful influence in having this matter set right.

We inclose you the official communication in which the post-office authorities made the above startling announcement, and remain, your obedient servants,

A LONDON FIRM.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—A friend has just pointed out to me that in the report of my "Remarks on the Dry Collodion Process," in the "PHOTOGRAPHIC NEWS," for February 25, an omission has been made which renders one sentence unintelligible. The sentence in question runs thus—"The bath I find work the best is made thus: dissolve 1 ounce of nitrate of silver in 3 ounces of distilled water, and 1 grain of bromide of ammonium previously dissolved in a little water, making up the whole to 9 ounces, by the addition of water and ½ ounce of spirit of wine, and finally adding the remaining ounces of solution of nitrate of silver."

It should be—"Dissolve 1 ounce of nitrate of silver in 3 ounces of distilled water; to 2 ounces of this add 3 grains of iodide and 1 of bromide of ammonium, previously dissolved in a little water; make up the whole to 9 ounces by the addition of water and ½ ounce of spirit of wine, filter, and finally add the remaining ounce of solution of nitrate of silver."

By inserting the above you will much oblige, yours truly,

CHAS. HEISCH.

Middlesex Hospital.

VIEWS FOR PHOTOGRAPHERS.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—The days are lengthening, and the period of the year suitable for out-door photographic pursuits is close at hand, and amateurs will be making preparations to avail themselves of their occasional leisure Saturdays for the purpose of taking views; I therefore respectfully trespass on your space by asking some of your numerous correspondents to favour us with a few additions to the list we are already possessed of in No. 4 of the "PHOTOGRAPHIC NEWS

It is desirable that they should state the easiest, sh and cheapest mode of getting to the localities the name. I would also suggest that they distinguish places which are freely open to the photographer from which can only be visited by special permission of the proprietor. This last is a point of some importance, as I know by experience, having last year gone as far as Warwick, principally to take views of the castle and grounds, but when I got there I found that although the noble proprietor freely admitted the public to *see* the building, &c., he would not permit any unknown photographer to take views: and not having a "*special permit*," I had to "chew the cud" of disappointment, which, however, I should not like to repeat. —I am, sir, your subscriber, ALEX. NICHOLSON.

Highbury New Park.

DRY PROCESSES.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—Now that the summer campaign is about to commence, you would confer a great favour on all photographers by telling us, in your next number, which of the various dry or preserved processes you think the best.

We have Taupenot's, Fothergill's, Long's, Hill Norris's, &c. &c. &c., and in the first volume of the "NEWS" you give others, with full details; but I am sure you would not advise a novice to try each and all of these, and then to judge for himself.

The examination would be both tedious and expensive, and the best part of the season would be over before a man could decide.

We want you then to tell us, from your practical experience, which process you would advise us to follow, or to point out one or two processes presenting a fair prospect of success.

I have, myself, tried many of these dry processes, but all were failures, or so nearly so, that I abandoned them in despair; still every writer vaunts some new process, and surely *all* cannot be false witnesses; there must be some basis for their testimony, even though the results may be exaggerated.

For myself, I should only require some process by which I may prepare a few plates at night, expose next day, and develop, fix, &c. &c., on returning home same evening. I don't want the plates to keep longer than—say 24 or 30

hours; and if, in your next number, you will say which I should try, with full details, and, particularly, the average length of exposure, I should feel you had done me a great service.—Yours, dear sir, very truly, M. M. D.

[We have seen excellent pictures taken by all the dry processes, and, in the hands of experienced manipulators, it would be very difficult to decide which gave the best results. With a beginner, however, the case is different, and, in deciding upon one of the dry processes the choice should rather fall upon that which gave the most promise of good *average* results, than upon one which, while it might be capable of something superior in experienced hands, would be likely to act with little uniformity in the hands of a beginner. Judging from our own experience, which we put forth with the more confidence as it seems to be generally corroborated by that of others, we are inclined to give the preference to the collodio-albumen (Taupenot's) process. We admit that there are many difficulties to be overcome before the amateur is likely to meet with uniform success, but these are not greater than have to be encountered in the commencement of any new study, and, when conquered, the learner will be in possession of, in our opinion, the least fickle of all the dry processes. In our pages will be found several accounts of this process, each alike in the main, but differing in detail; we will not pretend to decide between the respective merits of these, as they are unimportant in the hands of a beginner, and are for the most part only trifling modifications which may be usefully adopted as experience in working the process is gained.—ED.]

PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

THE next place at which I stopped, after leaving Ghent, was Termonde; better known to English readers, perhaps, as Dendermonde; so called from its situation being at the mouth of the river Dender, where that river enters the Scheldt. Here it was that the well-remembered, kind-hearted, Uncle Toby was engaged in the wet trenches when the town was besieged by the English, under Marlborough, in 1706; which trenches, but for a fortunate drought which prevailed for some weeks, would have been a very great deal wetter than they were: for the whole surrounding country could, at that time, be laid under water by opening the sluices; and they tell you that the same thing can be done at present; but the probable consequences of such an act would, it seems to me, be a good deal more injurious to the inhabitants than if they were to suffer a hostile army to take possession of the place.

This town is very old indeed, but it is of no great size, and offers comparatively few objects worth illustrating. I was induced to visit it from recollections of Uncle Toby, but I found that having arrived there from Ghent—from which it is only about twenty miles distant—rather early in the morning, I was able to see everything about the place, get several negatives, and leave the following afternoon. The first place I visited in the town was the church of Notre Dame; which is said, I don't know how truly, to be the oldest building in the place. It has an octagon tower, and is only worth taking on account of the associations I have referred to; for it possesses very little architectural beauty. It contains two or three pictures by Vandyke, and some others by painters of less celebrity. They still show you the house where Teniers lived; but it would give nothing of a picture, and I did not feel sufficiently interested in the painter of dirty, boozing Dutch boors, to take a photograph of his residence out of regard for his memory. I found two or three views of the fortifications worth reproducing, as well as of the town itself, including a portion of the river; but the photographer need not be long in deciding what pictures he will take, as the points of view are not far apart.

Malines offers a good many more objects of interest than Termonde. It is a much larger place too, its population being, at least, three times as great. This is the place where the celebrated Mechlin lace is manufactured, a fact of which any photographer who may happen to take a wife with him is quite certain when there to be reminded. The town is a very picturesque one, and presents a great many views which are well worth preserving; apart from the particular buildings of which one takes a picture almost as a matter of course.

In what is termed the Grande Place there are several old buildings, two or three of which are worth taking separately; and the four sides of the Place yield as many very good pictures. The cathedral, which, as is the case in most Flemish cities, is the most interesting object in the place, abuts on one side of this Place. It is dedicated to *St. Rumbold*, and is something more than four hundred years old. The tower has never been finished, but, nevertheless, its height is very great, being but a few feet lower than the top of the cross on St. Paul's Cathedral, though it is very far from the height to which it was intended to raise it, viz., 640 feet. While it must be admitted that the money spent in building this cathedral was well spent; yet the manner of obtaining it cannot be considered otherwise than immoral, it having been derived from the sale of indulgences.

The interior is large; and, like most Flemish churches that I have visited, is sufficiently well lighted to enable a photograph to be taken without difficulty. The pulpit, which is very well carved, and represents the conversion of St. Paul, forms a very good subject for a picture, together with the high altar. There are numerous chapels round the building, but none of them possess any object which renders it worth while taking a photograph, but, at the same time, they contain numerous paintings which are both interesting and curious, depicting events in the life of St. Rumbold. This church also contains a painting by Vandyke, the subject of which is "The Crucifixion," and which is considered to be one of the best that artist ever painted. Another church, that of Notre Dame, is a much smaller building. It owed its origin to a statue of the Virgin which ran aground on the spot where it stands; which image was said to have floated up the stream; and was, subsequently, engaged in the performance of cures of all sorts of complaints. Its end was a violent one, for the army of the confederates, under Oliver Temple, smashed it when they captured the city. This church of Notre Dame must not be confounded with that of the same name containing the beautiful picture, by Rubens, of the Miraculous Draught of Fishes. For this painting, with seven smaller pictures which surrounded it, three of which are said to have been carried off by the French, Rubens received 1,000 florins, and was only ten days in painting them. It is rather curious, but it would seem that the authorities who paid him estimated the value of his paintings by the time it occupied him to paint them; for we find that for the painting by the same artist of The Adoration of the Magi, which was formerly surrounded by seven other rather insignificant paintings, he was paid 1,800 florins, the work having occupied him eighteen days; that is, as in the former case, at the rate of one hundred florins a day. Part of the château inhabited by this celebrated artist, a painting of which, by himself, hangs in the National Gallery, is still standing, and is easily got at from Malines. I intended to take a photograph of it, and drove from Malines with that intention; but just before I got there, the rain came down in a thick drizzling form, which forced me to give it up; and I drove on to Vilvorde, which is a much better place than Malines.

Vilvorde is a miserably dull place, and I fancy very few Englishmen visit it except those who are interested in the internal arrangements of prisons, and who come here to inspect the Penitentiary, an enormous prison, which has furnished models for others in different parts of the world. Close by this prison, Tindal, the first who translated the Bible into English, was strangled and then burnt. The church has some beautiful carvings in wood, which are very well worth copying when one has plenty of time, but otherwise one would hardly feel disposed to unpack for the mere sake of obtaining these.

VIATOR.

Miscellaneous.

Photography as an Advertising Medium.—It is not an unusual thing to meet, in the course of one's perambulations, with photography as an advertising medium. It seems to be an especial resort now of showmen and theatrical characters. The great authority on the subject of advertising—Mr. Phineas T. Barnum, with his usual astuteness, has called it into requisition as a means of attracting public attention to his exhibitions. For instance, he is at present exhibiting the renowned Tom Thumb, who created such a *furor* some years ago. When this diminutive specimen of humanity was first exhibited he had to be content with lithographic and wood-engraved portraits, showing how little he was when compared to a life-guardsman. But, now that he has again appeared on the public stage, he has his portrait taken from life, alongside of a real life-guardsman. We have made inquiries as to the result of these photographic advertisements, and we are informed that they much surpass the old method of advertising by lithographs, which, however well executed, left only the impression on the public mind of an ideal; whereas, by having photographs taken, they see the real, knowing full well that in a photograph there is no room for any of those little tricks which the lithographer can so easily put into a lithograph. Mr. Barnum, however, is not the only showman who avails himself of the resources of photography. As we passed St. Martin's Hall, in Long Acre, the other day, our attention was attracted by another photographic advertisement, that of an actor who has some distant resemblance to portraits of Shakespeare, and who, therefore, has taken to the peculiar dress in which Shakespeare was supposed to attire himself, that is, if sculptors render the clothing of the bard correctly when they chisel out a statue. We could not help laughing at the idea, as we inspected the precious picture of a man with a faint resemblance to, and trying very hard to look like, Shakespeare. The model which he evidently had been studying, was one of those extremely cheap plaster casts, painted black, and slightly bronzed. The picture altogether was what may be termed richly ludicrous. The advantage which we saw in this photographic advertisement was, that it dispelled all those poetic and sentimental ideas which a lithographer would have been certain to have introduced. Mr. and Mrs. Howard Paul, in their entertainment entitled "Patch Work," have also several photographic advertisements, which generally seem to attract attention; while Mr. W. S. Woodin has had his entertainment put into the stereoscope. Lastly, though not least, we see that Mr. Spurgeon allows himself and his lady to be exhibited in the stereoscope; but whether it is with a similar object to those above alluded to, we are not in a position to say.

Wood Engraving.—In a recent article on the application of photography to engravings on wood, we referred to the *Illustrated London News*, as an example of the importance of any improved method of transferring designs to the wood block. We selected the newspaper in question as an example on account of its being unrivalled in the beauty of its designs and its enormous circulation, which rendered it probable that most of our readers had seen it. To give a more correct idea of the extent to which this paper employs the art of wood engraving, we may state that a reference to the list published shows that in the two volumes of last year there were no less than 1323 engravings, beside 22 large pictures printed in colours. If we assume that each of these engravings covered on the average a superficial area of sixty-four square inches, that will give no less than 84,672 square inches, or 588 square feet of engraved wood block.

Photographic Notes and Queries.

THE STEREOSCOPE.

Sir,—As you had an article on stereoscopes in a late number of your paper, perhaps the following may not be uninteresting to some of your numerous readers.

Take an ordinary stereogram in the hand, by the bottom, at the division between the two pictures. Fix the eyes upon a distant object: the axes of the eyes are then virtually parallel. Interpose the slide before the eyes at a distance of ten inches, more or less (that being the recognised average distance of distinct vision, but it must vary for different eyes). Great care must be taken not to allow the position of the eyes to change. Three pictures will now be seen, the centre one of which is stereoscopic.

A difficulty arises from the distance between the pupils of the eyes not being equal to the distance between two corresponding points of the two pictures. This may be overcome by holding the slide obliquely, so that the pictures are virtually the right distance apart; and the fact of one picture being nearer than the other is of no consequence. When the centre picture appears, turn the slide slowly till its plane is parallel to the eyes. The centre picture will then appear perfect.

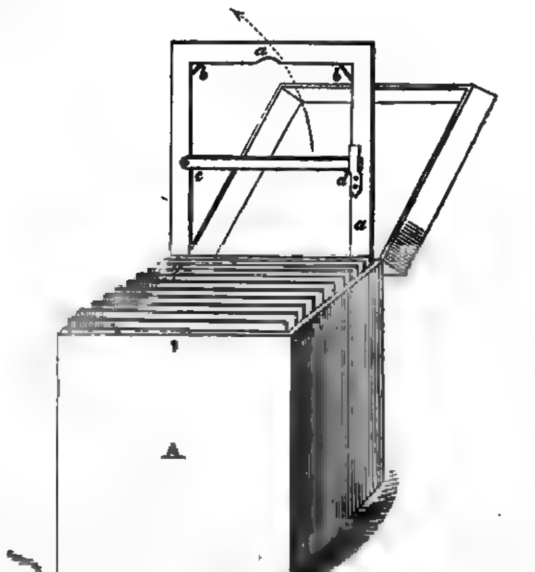
The pupils of my eyes are only 2⅜ inches apart, and the average distance between two corresponding points of the pictures of a slide is 3 inches. I found it difficult at first to prevent the axes of the eyes from converging to a point in the plane of the slide, and to keep them diverging, so that each eye should look at the picture opposite to it. No doubt a person whose eyes are wide apart would not experience this difficulty.

If this proves nothing else, it is a very satisfactory confirmation of the fact that the distinct images formed upon the two retinas (even without the assistance of lenses, as in the stereoscope) produce only one perfect image upon the mind.
X. P. R.

IMPROVED PLATE BOX.

Sir,—I herewith inclose a diagram and description of an improvement in the form of plate-box in general use. It is the result of numerous endeavours to obviate the abrasion of the collodion film, produced by the sliding action, necessary for the introduction or removal of a plate under the old system.

A really good negative is not so easily obtainable as some theorists would suppose, and its preservation, when produced, is of the highest importance. That the usual construction of glass-box is inadequate for this purpose, has been universally admitted, and for my own part, I remember carrying some negatives, during the winter, a distance of nearly a mile, at the expense of benumbed fingers and frozen films, rather than trust the same to the "tender mercies" of the plate-box.



Of course, varnish is a great protection: but it is often impossible, and always inconvenient, to varnish upon the spot; even were the use of those apologies for varnish—applicable without heat—a matter of no consideration. By

the use, however, of the simple modification of box I now describe, plates may be placed in the cells immediately after the last washing, thus securing them from risk of dust, breakage, &c., and, although subjected to tolerably rough carriage, will remain uninjured.

A plate-box A, of the ordinary description, is procured or constructed. It should be an inch or so larger in height and width than the largest plate wished for manipulation, and with a small increase of breadth in the grooves. A slight but strong carrier *a*, of some suitable material—papier-maché would answer admirably, but wood will do—is then made to fit easily into the first pair of grooves—a similar one for the second pair, and so on until the number be completed. At the inner corners of each carrier, short pieces of silvered wire are inserted diagonally *b b*, against which the face of the plate rests. Upon the opposite sides to these, a thin strip of a flexible substance (steel, zinc, or tin, for instance) is secured at one end by a small screw *c*, upon which it moves as a centre. The middle portion of this piece should be bent inwards, that when pressed within the detent *d*, a gentle pressure may be exerted upon the back of the glass. Should the operator wish to employ smaller plates than usual, carriers nesting within the principal ones would supply this desideratum.

In the practice of the dry collodion, a dark box constructed upon this plan would probably be advantageous, as, by an adaptation of the dark slide to the set of frames, an injury to the sensitive surface would be difficult, no isolation of the plate being requisite. EUPHOS.

Sheepscombe.

WATERPROOFING CALICO, &c.

SIR,—I beg leave to submit the following receipt to "One in the North," and other correspondents, for waterproofing calico, canvas, &c., for portable tents, &c. I speak from experience, viz.:—

Castile soap	½ ounce.
Distilled water	1 gallon.

Boil 30 minutes; skim. When cold, place in it the calico or canvas to be waterproofed for the space of 24 hours, then hang up to drip on a line. When half dry, again soak for 3½ hours in the following solution:—

Alum	8 ounces.
Sugar of lead	4 ,,
Distilled water	4 gallons.

Again hang up to dry on a line; don't wring it.

This process entirely destroys the capillary attraction in the fibres and threads of the calico or canvas, and the rain or wet runs off the surface (if strained tight) without lodging or penetrating through the material. The solution has no effect in changing the colour or texture of the material immersed.

Sugar of lead being a powerful poison, great caution is required. This is particularly applicable to the cheap tent invented by Mr. H. Doubleday, vol. i. p. 295.

H. BELLINI.

[We shall be glad to hear further particulars about the new varnishes, as well as the other points touched upon in our correspondent's interesting letter.—ED.]

SIMPLE STILL FOR PREPARING DISTILLED WATER.

SIR,—There are some who may not think it worth their while to distil water for themselves, when it can be procured in most towns as low as sixpence per gallon. There are, on the other hand, many who know that much of the distilled water of the shops is but the condensed steam of some engine, contaminated by the lubricating grease, or by the furred and foul pipes through which it runs. These will not grudge time, trouble, and expense in getting a home-made supply of "the genuine article." Among these latter there will be not a few glad to avail themselves of a simple, economical, and yet effectual mode of obtaining the object of their desire. To such I address myself. Go to the nearest tinman and buy for 10d. a common oil can, capable of containing—say two quarts; get also some 4, 5, or 6 feet of ¼ inch "tinned" pipe, together with a piece 3 or 4 inches in length, and of a size so much smaller, that it may readily pass into the longer tube. Insert the shorter tube into and through the cork or bung that fits the mouth of the vessel; fill the can three-parts full with water, and with a packing of tow or rag fasten the bung into its place, and put your "boiler" on the fire. Now, let us prepare the "condensing apparatus:" a pailful of cold water, and an empty seltzer water bottle, tied by its handle to the inside of the pail. Bring them to the hearth. The steam rises through the little tube; fit one end of the longer tube over *it*, and the other into the neck of the seltzer water bottle, and the work of distillation goes on without requiring any superintendence, and one is enabled, in the course of a short evening, to obtain as much distilled water as is requisite for a long period of active work.

The can, if made on purpose, might answer better with less height and greater evaporating surface. The longer tube is flexible, and after its junction with the chimney is allowed to rise a bit before it is bent down to the pail. I tie the bottle to steady it; the long pipe *may* need some support from a chair-back or otherwise. Time will be gained by keeping up the supply in the "boiler" by the heated water from the condenser, which will, in its turn, be advantageously changed for cold. D.

CARRYING PYROGALLIC ACID IN PAPER.

SIR,—I wish to take a journey with camera, &c., and I am at a loss to know whether or not I should carry my pyrogallic acid put up in little paper packets to mix with water for development. I have often noticed when buying it that the paper is very greasy: now, I wish to know if the acid loses any of its strength (by greasing the paper) or is it perfectly fit for use? By giving me an answer, through your valuable journal, you would greatly oblige an amateur.

R. HARRINGTON.

[Pyrogallic acid communicates a dark opaque stain to paper which has been in contact with it for any length of time, but we have not found that it thereby loses any of its properties. We always keep pyrogallic acid done up in little paper packets of 3 grains each, thus saving the trouble of weighing it out each time a fresh quantity of developing solution is wanted, and we have never noticed any inconvenience attending this plan.—ED.]

PORTABLE STAND FOR A DEVELOPING BOX.

SIR,—Again trespassing on your valuable space, I wish to know if you or any of your correspondents can suggest a firm stand on which to place a developing box when in the open air. I have been using a small box, and then placed it on my camera stand, which, although firm enough with a small body like a camera on it, vibrates with the box. I have now been making a larger developing box, and require "a *strong portable* stand" on which to place it, something that can if possible be packed inside the box. If you or any of your subscribers can suggest something of this sort, I think they will have conferred on out-door photographers a great boon. P. F. P.

PENETRATING VARNISH.

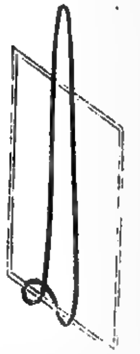
SIR,—In reply to a recent correspondent, I can inform him that I have found the following best for a penetrating varnish for alabastrine portraits:—

Mastic varnish prepared for artists ...	1½ ounce.
Spirits of turpentine	½ ,,

The glass to be warmed before applying the varnish, and the picture afterwards to be kept in a warm room; the varnish will then set in a few hours. THOS. GILLIVER.

ANSWERS TO MINOR QUERIES.

Improved Dipper.—*C. D.* asks if any improvement has been made on the usual-shaped glass dipper, as in his hands this instrument has knocked the bottom out of an expensive glass bath. Lake Price, in his *Photography*, has described a very excellent contrivance, by which all similar accidents may be avoided. Take a piece of pure silver wire, about three times as long as the bath is high, and bend it into the shape as shown in the cut. The wire should be riveted together at the upper end. The advantages of this are numerous; it is not liable to break, either when in use or in packing or unpacking for a journey. The metal falling on the bottom of the bath is not so liable to do any injury, and if the two supporting points at the bottom are made tolerably wide, there is no danger of the plate slipping off, neither will it adhere so obstinately as is frequently the case when a glass dipper is used. It must of course be kept very clean, and should on no account be made of alloyed silver, but the perfectly pure metal.



Gallic Acid in the Nitrate Bath.—*X.* Gallic acid has been recommended in small quantities as an addition to the nitrate bath for collodion negatives by Mr. Berry, and, subsequently, by M. Gaudin. A few grains to an 8 or 10 ounce bath, with the addition of a drachm of glacial acetic acid, are said to produce an extraordinary rapidity; the image being frequently visible as soon as the plate is taken out of the camera, and the development continuing without further application of a reducing agent. We have, however, never tried it ourselves, and should advise our readers not to commence with too large a quantity of "bath," as the chances are much in favour of the whole being irretrievably spoilt.

Solid Developing Mixture.—*Friday.* A correspondent informs us that he has for some time past been in the habit of using a mixture of 4 ounces of dry (white) protosulphate of iron and 1 ounce of bisulphate of potassa for developing collodion pictures. A drachm dissolved in 1 ounce of water makes a very excellent developing solution. Our correspondent states that he keeps it ready mixed in ½-ounce packets; and when required for use he has merely to empty a paper into his (2 ounce) bottle, and fill it up with water. The advantages of having a portable mixture for this purpose, which may be kept ready for use in weighed packets, are very great, as anything which tends to substitute a dry solid such as bisulphate of potassa for a liquid acid cannot fail to prove a boon to itinerant photographers. We are not of opinion that our correspondent's mixture is the most suitable for negatives, however it might be for positives: probably, for the former purpose, a mixture of pyrogallic acid and a solid organic acid would be preferable; citric acid, in our hands, has not fulfilled all that we once anticipated from it; but probably a few experiments would soon be rewarded by the discovery of an acid equal, if not superior to, acetic acid. MM. Davanne and Girard speak very favourably of succinic and tartaric acids. These can easily be obtained, and would be well worth a trial.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Correspondents will find it advantageous to write their signatures in a legible manner, otherwise they may have difficulty in identifying the answers to their queries.

Paul Pritchard and Others.—1. Cases for binding the first volume of the "Photographic News" may be obtained on application to the publishers, through the ordinary channels, price 1s. 6d., or by post 1s. 8d. 2 A landscape lens of 15 inch focus. 3. Send a stamped and addressed envelope.

P. J. (Glasgow).—1. Where glacial acetic acid is recommended, of course it is not necessary to add common acetic acid as well. 2. Either will do, it is only a matter of taste. 3. Negative developing solution should only be made in small quantities, as it deteriorates on keeping; positive solution prepared with iron will keep much longer. 3. The plan you suggest has frequently been recommended; see previous numbers.

J. A.—Received with thanks.

A. Henderson.—The publishers will attend to the first part of your letter. 1. We do not like the process you name: the gelatine was precipitated. 2. Answered in "Minor Queries." 3. It is a common fault, and we do not know a certain remedy. 4 We hope soon to receive a communication from a correspondent on the subject of developed positives.

W. H. W.—1. We cannot give the address; can you not favour us with the information required? 2. From your account your tent must be an excellent one, and we shall be pleased to receive a description of it. 3. We are much obliged for your process and will try it. 4. There is one difficulty against the mark which you say will in future be your signature; it will not admit of being printed.

A Subscriber (signature illegible).—Boil your bath with a grain or two of cadmium for a few minutes, then filter and add a few drops of glacial acetic acid.

Stereo.—1. If you send us a stamped and addressed envelope, we will forward the information required. We shall be glad to see a description of the apparatus when you have completed it. 2. Inquire at the patent office; we are not able to give you the information you require. Many similar contrivances have, however, been made before January 1856.

J. T. Stant.—Received with thanks.

G. H. W.—Your suggestion will be attended to. 1. Negatives produced from positives by an intensifying process are not so good as when produced in the ordinary way. 2. Pyrogallic developing solution ought not to become discoloured until it has done its work, and fully brought out the negative.

T. W.—A half-plate portrait lens will not do so well for taking stereograms as a quarter-plate one, as, owing to the greater length of focus, the "field" will be so very limited.

Zelatic.—We made the only suggestion that it was possible for us to do under the circumstances; as you say that no hyposulphite could have got into your bath, we can offer no further opinion on the matter. If you will send us some of the black precipitate, we shall be able to tell you what it is. Shell-lac is bleached by chlorine, but it is an operation which could not be performed by an amateur unless he had a well-appointed laboratory.

A Voice from the New World.—All that is known on the subject of photoglyphic engraving will be found in our pages. The process, like all others, requires experience to be gained in its manipulations before good pictures can be produced, and the same may be said of photolithography. Pyrogallic acid is a better developing solution for negatives than protosulphate of iron: it will keep good for a month or more, if cool and in the dark. A nitrate of silver bath, when once in order, should not change for many months, if kept in a stoppered glass bottle in a dark, cool place.

B. Mayne.—1. Add powdered perchloride of mercury to hydrochloric acid until no more is dissolved. 2. 10 grains of carbonate of soda to 1 drachm of water. 3. Already explained in our first volume. 4. We will bear your request in mind. 5. At most medical glass warehouses.

J. Cann.—Several good methods will be found in previous numbers; we cannot help you to a better one than your own, until we know what that is.

Stanley, K. W.—1. The collodion must be prepared in small quantities as wanted, as it will not keep. 2. You will have more chance of getting a quick picture by using a *large* aperture to your lens.

F. X. Y.—Received with thanks.

Geo. Chaloner.—A spectacle glass was the one intended.

A Young Pupil.—The size to which pictures can be enlarged with a quarter-plate portrait combination in a copying camera depends upon the length of the camera, as the size of the enlarged image depends entirely upon the distance the screw is from the lens The focal length of a quarter-plate combination will, however, be found too long to make it convenient to enlarge a picture more than three or four diameters.

P. R. J.—For a good positive developing solution see Vol. i. p. 12; and for a varnish suitable for your purpose, see Vol. i p. 143.

I. C. by U.—1. Use a little more iodising solution to the collodion than is recommended (perhaps a quarter or half as much), and use a fifty grain silver bath: in this way you will be likely to get most of the desired peculiarities. We cannot say more on the subject at present unless we were to see some of the collodion. 2. The great fault of the developing solution of protosulphate of iron and acetate of soda (Vol. i. p. 240) is that it is liable to stain the plate. Try in preference the ones recommended at Vol. i. p. 288. 3. Extreme slowness is one of the faults of this much vaunted lens.

M. C. B.—We decidedly recommend that which you have called No. 1, as being superior to any.

X. P. R.—Your second valuable communication is received with thanks, and shall be inserted the first opportunity. We shall be glad to hear further from you on these or other subjects.

F. R. E.—We shall be pleased to receive a description of your camera box. The tent seems an excellent one from the description, and would no doubt work well in practice.

T. Clark.—We shall be glad to be the means of communicating your ideas on "fading" to the photographic world, if they seem to be such as would throw any new light upon this evil. What you state is very curious.

A Kerry Man.—Many thanks for your valuable hint; it will, doubtless, prove of great use to many of our readers. 1. What is sold under the name of "iodised collodion," "negative collodion," "collodion for negatives" (or positives), is virtually the same thing, being a mixture of plain collodion (a solution of pyroxyline in alcohol and ether) and of iodising solution (a solution, in alcohol, of iodide of potassium or some one or more of the numerous analogous bodies). The proportions of each of the ingredients may vary between tolerably wide limits, without much alteration in the properties of the resulting mixture; but as some little skill and care is required to make a good article, we should advise you, as a beginner, to purchase it ready for use, the directions in the different processes for preparing iodised collodion being intended for advanced photographers. Your bottle of "iodised collodion" is ready to begin work with; and you need not trouble yourself at present as to the exact quantity of iodine in it. 2. The pyrogallic developing solution is to be of the usual strength, as recommended in Vol. i. p. 24. 3. The albumenised paper you received is already prepared with a suitable mixture of albumen and chloride of sodium or of ammonium, and is ready to be floated on the silver bath. The directions you quote, mean, so many grains of chloride to the ounce of *albumen*. Almost any printing process may be used with your paper; try the one at Vol. i. p. 86, with the further explanations given in our present number.

Communications declined with thanks:—G. S.—A. B. C.—Photo.—Alexandria (signature illegible)

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—F. G.—Positive.—G. C.—L. Y. O.—Jabez.—G. C. H.—A Very Young Photographer.—Plato.—A Piano Forte Maker.—B. S. M.—Chalk (No).—Mornington.

In Type:—S. Maddison.—A Wax-paper Man.—T. Beta.—H. Bellini.—A. B.—John Rowlinson.—Cyanide.—A. Henderson.—Suggestor.—P.—W. J. W——n.—F. R. E.—Geo. Dunn.—J. J. H.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 29.—*March* 25, 1859.

PHOTOGRAPHS AND THE BOOK POST.

OUR readers will remember that we last week published a letter from "*A London Firm*," complaining of a charge made by the Post-office. The firm in question is one of the first—if not *the* first—in London; and it was impossible for us to doubt that their complaint was well founded. But the matter being one of great public importance, we, before publishing it, forwarded a proof for examination, in order to avoid the possibility of error. This proof was returned to us with a note, without having undergone the slightest alteration, and it was published in the "PHOTOGRAPHIC NEWS" of Friday last. It will be seen, therefore, that we took every precaution in our power to assure ourselves of the accuracy of the statements contained therein.

It is not necessary, in addressing photographers, that we should dwell on the extreme importance of the statement contained in the letter we have referred to; consequently, they will readily understand our motive for addressing the following letter to the Editor of *The Times*, and which was published in that paper on Saturday last:—

"*To the Editor of 'The Times.'*"

"SIR,—Will you allow me the privilege of making myself heard by the Post-office authorities, through the medium of *The Times*, on a subject which affects, perhaps, 500,000 individuals? My grievance is as follows:—

"Ever since the publication of the amended regulations for governing the book post, photographers and dealers have been in the habit of forwarding photographs through the post, without any objection being made; in fact the fourth regulation appears to me expressly intended to include sun prints, and most certainly was never intended to exclude them; yet Mr. Rowland Hill has thought fit within the last few days to pronounce an arbitrary dictum, to the effect that photographs do not come within the terms of the Post-office regulations. The occurrence which drew forth this expression of opinion on the part of that clever, but somewhat arbitrary official, who directs the energies of the Postmaster-General, is contained in a letter addressed to the *Photographic News* by a photographic publishing firm which *The Times* has recently assisted to make famous. It was natural that as the matter was one in which photographers are principally interested they should address their complaint to their own special organ; but I feel that though the publication of their complaint in the *Photographic News* may excite as much latent actinism in Mr. Hill's organization as would suffice, under other circumstances, to print several photographs, it will not be sufficient to induce him to change his expressed opinion; and, as the matter is one in which the public is largely interested, I venture to hope that you will allow me on the part of the general body of photographers to make our grievance known; and through the columns of *The Times* to assist in impressing on the Post-office official's mind that the Post-office was made for the public and not the public for the Post-office.

"I am, Sir, your most obedient servant,

"THE EDITOR OF THE PHOTOGRAPHIC NEWS."

"*Photographic News* Office, March 17."

In reply to this letter, Mr. Rowland Hill wrote to *The Times* denying that there was any ground for the statement contained in it, and also that there was any intention of altering the regulations which govern the book post, which we need scarcely say includes prints, &c. We should have been very glad to believe that such was the case, but, unfortunately, the letters written from the Post-office appear to be in direct contradiction with the publication which bears the title of the "British Postal Guide," and is published "by command of the Postmaster-General." We have before us at this moment a letter, dated from the General Post-office, St. Martin's-le-Grand, duly numbered 51388, and signed J. Tilly, which was written in reply to one addressed to them by the "London Firm," in which the following passage occurs:—"I can only repeat . . . . that photographs cannot be sent to France from this country under the regulations of the book post." On turning to the "Postal Guide" we find the following, included in section 81:—"As regards packets sent through France" (except to certain countries enumerated, in which Switzerland is not included), "the term 'printed papers' does *not* include cases or rollers, or maps, book-markers, pencils, pens, &c., but *does* include parliamentary proceedings, books of every kind, sheets of music and *prints*." How are we to reconcile this apparent contradiction? The official letter says one thing, the official guide another—for the denial of Mr. Rowland Hill involves the admission that photographs *are prints*. The letter says, prints may *not* be sent to certain places under certain circumstances; while the *Postal Guide* states the exact contrary. By which are we to be guided?

It is in no captious spirit that we make these remarks, for we have special reason to recognise the progressive improvements that are made in the arrangements of the Post-office, but until we obtain an explicit answer to our question, no transmission of photographs from this country through France can take place, except paid for by letter rate.

CELESTIAL PHOTOGRAPHY.

THE following extract from the report of the council of the Astronomical Society to the thirty-ninth annual general meeting, which we have taken from the last number of the *Monthly Notices of the Astronomical Society*, will, we doubt not, be perused with interest by our readers, as affording an evidence of the important services our art is likely, ere long, to render to the sublimest of all the physical sciences—Astronomy:—

"Mr. De La Rue during the past year has continued his experiments in celestial photography, and has made several improvements in the process; his observatory has been devoted chiefly to the delineation of our satellite, of which a great number of very perfect negatives have been obtained. Transparent positive copies on glass, 8 inches in diameter, have been presented by him to several observatories and

astronomers; and he informs the Council that Mr. Fox Talbot has kindly proposed to apply his newly-invented art of heliographic engraving to the reproduction of one of the lunar photographs: should this be successful, it is hoped that the distribution of these beautiful objects will become more general. When two of the 8-inch photographs, presenting a sufficient difference in libration, are viewed by means of the reflecting stereoscope, the elevations and depressions of the lunar surface are made remarkably conspicuous, and an opportunity of studying the physical structure of our satellite is afforded which is likely to prove of value. The stereoscope adapted for the display of these photographs was exhibited at one of the meetings of the Society. Mr. De La Rue is at present engaged with experiments in photography with a 4-inch silvered glass reflector made by Dr. Steinheil, who has undertaken to make for him a 13-inch silvered glass speculum, with which it is probable that a considerable advance will be made in consequence of the greater amount of light reflected by silver in comparison with speculum metal, and the probability that the time of exposure of the collodion film will be considerably reduced. He informs the Council that he made one attempt to obtain a photograph of Donati's comet, but that he did not obtain any trace of an image in 60 seconds: this he thinks attributable to the low altitude of the comet at the hour he made the experiment, and not to want of requisite brightness of the comet itself. A severe domestic calamity prevented a repetition of the experiment under more favourable circumstances.

"Although Mr. De La Rue was unsuccessful in producing an impression of the comet with his telescope of 10 feet focal length, Mr. Usherwood, an artist residing on Walton Common, succeeded in obtaining, in 7 seconds, a good negative with a portrait lens of short focus. The camera was stationary, hence the image is somewhat imperfect, nevertheless it bears enlargement of four times tolerably well. Mr. Usherwood's residence is situated about 700 feet above the sea-level, and it is possible that his success is in some degree attributable to this circumstance, but is chiefly due to the large area of the portrait lens and the relative shortness of its focal distance. So far as the Council has been informed, this is the only instance of a photograph of Donati's comet having been obtained.

"The photoheliograph erected in the dome of the Kew Observatory under the direction of Mr. De La Rue for the Royal Society, has been at work since the beginning of last March, and excellent photographic pictures of the solar spots and faculæ are obtained. Certain alterations have been made by Mr. Welsh, the Director of the Observatory, in order to regulate the term of exposure of the collodion plate to the sun's action; with these alterations the instrument gives very good results. The time of exposure necessary to produce a wet collodion picture even when the aperture is diminished to about 1 inch, and the image enlarged by the secondary lens to 4 inches in diameter, is only a very small fraction of a second. The apparatus for regulating the duration of light-action on the collodion plate consists in a sliding plate, having a slit which can be increased or diminished in width, and situated near to the collodion plate; this is moved by means of a spring across the interior of the telescope; and the time of exposure is governed partly by the regulation of the opening in the slit, and partly by accelerating or retarding the motion of the plate across in front of the sensitive plate. The work of the Kew photoheliograph has been of late interrupted by the illness of Mr. Welsh, but it is intended to appoint an additional assistant, whose duty it will be to take photographs of the sun each day that the weather permits.

"At the suggestion of Mr. De La Rue, M. Otto Struve has proposed to the Academy of St. Petersburgh to establish a photoheliograph in Russia, and the subject has received favourable consideration by that body. Thus, it is very probable that Sir John Herschel's suggestion, that the sun's spots should be daily recorded at several stations, will soon be carried out.

"Father Secchi continues to devote his refractor to photography, and has recently succeeded in obtaining a photograph of *Saturn*. The photographs of the moon produced by him have been distributed to several observatories.

"Mr. Bond has communicated to the *Astronomische Nachrichten* a series of experiments on stellar photography, made under his direction by the photographers Messrs. Whipple and Black, at the Observatory of Harvard College, in 1857 and 1858. These experiments were made on the double-star *Mizar* and its companion, and on *α Lyræ*, with different apertures of the object-glass, from 1 inch up to the full aperture, 15 inches, and with different times of exposure. The object of these experiments was to ascertain the possibility of classifying stars according to a scale of photographic or chemical magnitudes analogous to the common optical scale, but differing essentially in the fact of its being based upon actual measurements in the place of the somewhat uncertain estimates hitherto resorted to. Mr. Bond finds that a certain definite exposure depending on the brightness of the star is required before any trace of light action can be detected on the collodion plate. At the expiration of that interval the photograph is suddenly developed by the clustering together of from ten to twenty molecules within an area of about 1 second in diameter. The number of molecules increases rapidly with the time of exposure, while the boundaries of the photograph extend on all sides. Mr. Bond remarks that the diffusion of light-action over considerable areas is obscure, and that if it were due to the dispersion caused by imperfection of the object-glass, it ought to be checked by reducing the aperture, which is not the case; he is inclined therefore to think that atmospheric disturbances may in part account for the phenomenon. Mr. Bond also finds that the images of stars increase by the addition of equal areas in equal times. Hence that, in comparing the photographic images of two stars, the time of exposure of each has to be taken into account. Mr. Bond has given several tables of comparison between the observed diameters of star-images and those computed according to formulæ he has proposed, which show a remarkable coincidence between the two values, proving the importance of the photometric process."

NEW PRINTING PROCESS.

BY WENTWORTH L. SCOTT, ESQ.

I BEG to give, for the benefit of the readers of the "PHOTOGRAPHIC NEWS," a brief account of my recent improvements in positive printing. I have no doubt but that the process will prove as successful in their hands, as it is satisfactory in my own.

My *salting solution* is thus prepared:—

In about half a pint of distilled water the following substances are dissolved—having been added in the order here placed—

Pure chloride of ammonium	...	...	200 grains
„ bichloride of mercury	...	...	20 „
„ acetate of lead (*neutral*)	...	...	30 „
„ starch (either arrowroot or potato)			40 to 60 „

Agitate the whole, and boil for 15 minutes: when cool add a sufficiency of distilled water to make its volume one imperial pint, and filter. If the paper is of a very fine, even texture, *immerse*, in the above solution; if a more *open* variety, float on the surface for 2 or 3 minutes.

The papers I myself prefer are those of *English* make, and also the *Papier Rivé* and *Papier Saxe*; most of the other kinds contain too large a quantity of sulphates, as may be known by analysing the ash.

The sensitising solution I employ is the ordinary one of 60 grains of nitrate of silver to the ounce, to which has been added about 2 per cent. of *nitrate of lead* and a little *alcohol*.

Expose in the pressure-frame as usual, but only *slightly* over-print; this part of the process will occupy less time than by the ordinary methods, owing to the greater sen-

sitiveness of the paper. When the print is removed from the frame, it should be immersed in water for about a quarter of an hour; whenever practicable and convenient, the water should be used *hot*—say 30° below the boiling point. It must next be in contact with brine, or with a solution of the ordinary commercial sal-ammoniac, for a few minutes; when, after rinsing, it may be plunged into the *toning bath*, for which the formula is given below:—

Biborate of soda (borax)	120 grains.
Solution of chloride of soda *P.L. strength*	20 to 40 minims.
Terchloride of gold	7 grains.
Water	20 oz.=1 pint.

Mix and filter. The "toning" will proceed rapidly, and the operator has a choice of several tints. The final processes are, rinsing, fixing with a solution of hyposulphite of soda (rendered very slightly alkaline by the addition of a little caustic soda), 4 or 5 ounces to the pint, and washing for 6 or 8 hours in a stream of running water.

The above "toning bath" is equally good for all kinds of paper—salted or albumenised—and prepared by any of the usual methods; but for softness and delicacy of tone, my salting solution will, I think, be found to be the "best out." Albumenised paper, too, gives finer results by being floated on the same, and dried previous to sensitising.

7, Brunswick Terrace, Westbourne Grove, W.

DR. MUSPRATT ON PHOTOGRAPHY.*

SECOND NOTICE.

IN our last article on this able work now issuing from the press, we ended with the notice of the glass processes; in this new number, 49, we have the paper negative processes—printing, in its several branches—engraving by light—and the stereoscopic portion of the art.

THE PAPER PROCESSES commence by giving the two ways of iodising paper for the CALOTYPE PROCESS, viz., by the single and double washes. After it is well washed, Dr. M. states that it will *keep for some weeks*, adding, that some people affirm that it will *keep for an indefinite period*. As to this question, we are, ourselves, in no doubt, as we have invariably found the old iodised paper—even when years old—better than the new. Then comes a comparison betwixt the two methods of iodising by the single and double washes. He states that the *single* is the most economical, but, at the same time, the least certain; and this must certainly be correct, if the time of immersion in the iodide of potassium solution after the wash with the silver is *critical*, owing to the danger either of leaving free silver or dissolving the iodide of silver; but if there be any danger of the solution of the iodide of silver, what is more simple than to saturate the iodide bath by allowing a drop or two of silver to fall into it? We mention this on account of some late experiments with very large sheets of paper, and the washing of these when iodised by the single wash was very troublesome, as each sheet had to be immersed in a large vessel of water alone, owing to the pressure of one upon another when washed together; and when iodised by the single wash, the washing by having three or four vessels of water, and passing them on, when iodised, from one to another until they all meet in the last, and then a final soaking of an hour to complete them, saves an immense quantity of water and time, and, we believe, answers equally well. In small sheets, up to 10 × 8, there is no need of this arrangement, as a quantity may be washed at the same time. The excitement of the paper is next discussed, and here an old calotypist cannot fail to be struck by the very small quantity of acetic acid used in the silver solution, which is about a quarter of that recommended by most operators. This, in another place, he explains by telling us, that the want of half-tone, too great an intensity of the blacks, and want of detail in the shadows—which are a frequent defect of paper negatives—may be thus remedied. These faults, or most of them, we believe, are less frequently met with in paper than in glass, and, in calotype, seldom trouble us, as the common drawback to this process is, getting a paper which will give us blacks dense enough. As to using so small a quantity of acetic acid, our experience is also contradictory—we have often found that even the usual formulæ contain too small a quantity, and, by increasing the proportion of this acid, we have obtained beautiful clean pictures with no want of half-tone, when, otherwise, dirty spotted *daubs* were all we could get: but, it must be remembered, that when we used much more acid, we always made the gallo-nitrate half as strong again, using 15 drops where we used 10.

THE WAXED PAPER AND OTHER DRY PROCESSES he terms "Calotype process No. 2," under which he includes all papers iodised by immersion in the iodides and so kept for use, until rendered sensitive by applying the silver. In the iodising he recommends no salt but the iodide of potassium, in this agreeing with our own instructions published in 1853, and afterwards states that most, if not all, of the other substances employed—rice-water, gelatine, honey, bromides, cyanides, fluorides, &c. &c.—are absolutely inert; this agrees with what Mr. Townshend long ago declared as his experience, or is even more simple, as he used bromide also.

His summing up of these processes has also a fact or two to be noticed. He condemns the use of salts of cadmium instead of potassium, as introduced into the nitrate bath it has an acid reaction, which renders the paper less sensitive, prevents the details from coming out, and makes the blacks less dense. Then he states that calotype negatives are not evenly waxed by the common mode of proceeding, as they cannot thoroughly imbibe the wax without the size is altogether removed, which may be done by immersing the finished negative in equal parts hydrochloric (muriatic) acid and water, and then it will present a beautifully even appearance. The hydrochloric acid, *so diluted*, does not injure the picture in the least.

Lastly, he says, the paper processes are very insensitive when compared with wet collodion. This may proceed from the great quantity of acid used—certainly they are NOT as sensitive as collodion, but very few operators deem the calotype so quick as it really is. If iodised paper is excited by applying aceto-nitrate solution undiluted, exposed while wet (as collodion), and developed immediately by applying saturated solution of gallic acid, the picture comes out beautifully clean, and the time of exposure is wonderfully short. About thirteen years ago, with the lens of a small magic lantern, twenty seconds gave us a very good negative, than which we have seen few better even in these improved days; had the lens been one of the modern ones, doubtless ten seconds would have sufficed.

THE PRINTING PROCESSES come next, where the several methods of producing the picture are mentioned, including *transparencies*; then the CARBON printing is gone through at length, noticing Blair's improvements and ingenuity in placing the negative at the back of the prepared paper, and so gaining better results; but it is needless to go through this part, as the "NEWS" has had enough of it of late to give everybody a full explanation of what is not changed here. The same also may be said of the URANIUM and INK processes, which last, we think with others, will one day be *the* process.

The SUN-PRINTING ON PLAIN PAPER is thus described:—float your paper, the best Saxe, on 4 grains of gelatine and 4 grains of salt dissolved in one ounce of water, let it remain two minutes, dry, and excite with a 50 grain solution of ammonio-nitrate, wash, after the picture is printed rather deeply, and tone by immersion in bath made thus—

Distilled water	2 ounces.
Hyposulphite of gold and soda (sel d'or)	1 grain.
Hydrochloric acid, pure	5 minims.

wash again, and immerse in solution of hyposulphite of soda, 1 part to 20 parts water, well wash as usual.

We have little fault to find with this, but still we do not

* "Chemistry, by Dr. Sheridan Muspratt, F.R.S.E., M.R.I.A." Article, Photography, No. 49.

like the mixture of *any* acid in the toning, and the fixing solution is *not strong enough*. It has been clearly shown that without the hyposulphite solution is much stronger, a salt is formed *insoluble in water*, and not the otherwise *very* soluble hyposulphite of silver.

In his PRINTING ON ALBUMENISED PAPER he recommends 6 grains of salt to the ounce of albumen and water in equal parts, and excites by floating upon a 40 grain solution of silver. He then tones and fixes in the same bath, made by mixing 1 part of hyposulphite of soda to 6 parts of water, to every ounce of which half a grain of chloride of gold is added; here it is left until the change of colour is completed. According to many this process is not to be found fault with; but we always feel distrust of those processes which tone and fix in the same bath.

PRINTING BY DEVELOPMENT.* The paper is immersed in a solution of 6 grains salt and 1 *part* (we suppose *grain*) of iodide of potassium to the ounce of rain water; excite by brushing over it—

Distilled water	... ...	1 ounce.
Nitrate of silver	... ...	30 grains.
Lemon juice ...	... ...	6 drops.

This reminds us strongly of the *citrate of soda* process. Expose until a faint image shows itself, develop with a saturated solution of gallic acid, and fix as in the ammonio-nitrate process, as it needs no toning. This, we think, hardly gives exposure enough to develop well, as the picture must show *all the detail*, though faintly; because little, if any, invisible portions come out in the after treatment, and the picture is not so hard when exposed rather longer.

Then, to sum up, Dr. M. declares ammonio-nitrate and developed prints to be permanent, and albumenised pictures to fade frequently. Experiments, however, flatly contradict this statement; and when the latter are well washed, if an advantage has been observed on the side of any process, it is this. One of our greatest photographic chemists not long ago declared that the *developed prints had not been observed to have any advantage over those printed by direct sunlight.* Next we have an account of Moule's "Photogen," with the composition which he uses. This also has been discussed so much, that it is useless to enter again into the question as to the results.

PHOTO-LITHOGRAPHY follows, and Dr. M. gives us an account of Messrs. Cutting and Bradford's, of Boston, U.S., method, which differs very little from the generally-known one; to the bichromate solution is added sugar and gum arabic; after exposure it is washed with a solution of soap, and so, the patentees state, that an insoluble soap is produced. Dr. M., however, thinks this a very dubious explanation. It is the use of sugar and soap to which the patent refers; but this method differs little, if at all, from what has long been known and used, and the patent seems useless, to say the least of it.

PHOTOGLYPHIC ENGRAVING, patented by Talbot in 1858, is another method of getting a printing plate by photography. This has been so lately described at length in our pages, that it would but be repetition to go through it here.

PHOTO-GALVANOGRAPHY is next described at length, from the printing (as we may term it) on the gelatined plate of glass, swelling the hidden parts of the coating by immersion in water, taking the gutta percha mould, and from it the electrotype, and from *that* the plate to be used in the printing by the copper-plate printer. Altogether this process is stated to occupy three or four weeks. Thus ends this branch of photography, which is, doubtless, one day to be the most important part of this already universal and interesting art. Of these methods our own opinion is, that photo-galvanography will soon disappear, and photo-lithography and photoglyphic engraving be the most used. If our readers ask why, we reply, that the tedious electrotyping, the comparatively long time, and, above all, the reproduction of the plate from the gutta percha mould, are all objections to this process; and when we observe the *straight-forward* way in which Talbot's method comes to its result, who can doubt the end being what we say? Again, very few, if any, of the galvanographic plates have been laid before the public without considerable touching up by the engraver, and so we have scarcely had a chance of judging as to its real results. But on this subject, doubtless, there are very different opinions.

THE STEREOSCOPE is here discussed at great length, and yet Dr. M. declares *he only gives the leading facts*. The construction of the instrument is here described at length, with an explanation of its principle illustrated by a cut showing the angles of vision, &c. The different forms of stereoscope are then described with illustrations, commencing with the reflecting form, and at the end of this description, Dr. M. declares the reflecting stereoscope to be not open to any single objection, practical or theoretical. So we ourselves think; and were it not that it is a little troublesome to affix the pictures so as to perfectly coincide, we see no reason why it should not be exclusively used.

THE LENTICULAR STEREOSCOPE he then describes by a wood-cut, showing the best form—recommending achromatised meniscus lenses (we quote his own words), five inches focus with the hollow sides outward—in fact, the very lenses used to take the pictures—and sets them in a blackened box, through which the eye looks on to the picture placed on a sliding back.

Then we come to STEREOSCOPIC PICTURES where the angle is disputed, or rather is declared to be "evidently right when the lenses are $2\frac{1}{2}$ inches apart *only*." Next we have Brewster's opinion as to the general lenses being much too large, and recommending the division of one large lens to make two of exactly equal focus. Wheatstone's rules for the distance betwixt the lenses are then given and compared with Brewster's—the former make the distance very great, even 4, 6, or more, feet for objects more than 150 feet from the operator. Next we have notices of the mounting, and rules to be observed in the taking of views—their defects and remedies—recommending the form of stereoscope which is best—ending in rather a severe criticism on those who advocate a greater distance betwixt the lenses than $2\frac{1}{2}$ inches. *If it be thought desirable to represent things as one should see them if the eyes were farther apart than they are,* THEN *the distance may be exceeded!*

Thus ends Dr. M.'s article on this growing art. What are the deductions from it? Even in its present stage must not the non-photographic reader be astonished at the already numerous applications of what was ten or fifteen years ago confined to the uncertain production of paper negatives and daguerrotypes? As a PHOTOGRAPHER'S MANUAL we have reviewed this article, and, as the reader must perceive, have found some things in which our opinion (as manipulators) runs counter to Dr. M.'s; yet the writer of the article will surely esteem it an honour to be reviewed as though he had written it for a practical purpose, rather than think it harsh to be reviewed as *practical* when it was written for the public! He has done his task well, and will secure many readers. The interest in Photographic Chemistry is much greater than most men think—he who begins *mechanically* very often ends *chemically;* and the field for investigation is most alluring and illimitable for the working chemist as well as the natural philosopher.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

MUST we therefore say that there is nothing more to attempt, nothing more to be accomplished? On looking at the magnificent results which are offered to the admiration of the public, one is tempted to believe it; but, one *chef d'œuvre* on collodion is often followed by so many inferior

* On Printing by Development, and other methods, we hope shortly to receive an important communication from a correspondent to lay before our readers.

* Continued from vol. ii. p. 15.

negatives, even in the case of professional photographers, that we think beginners will be grateful to us if we remove a few of the obstacles in their way.

We have already observed, on referring to the spontaneous decomposition of gun-cotton, that this substance when properly made and preserved remained unaltered for an indefinite period, and this we repeat. We are more than ever of that opinion. In fact, ever since we have made gun-cotton, in other words ever since it was discovered, we have never been able to detect any change in it from keeping, even when we have kept it for three or four years; which we ascribe, not only to its being perfectly washed, but to its being kept in a place where air had free access to it, and simply folded in several sheets of blotting-paper.

It appears to be a practice among English photographers to prepare their gun-cotton by means of acids kept at a high temperature. We give no opinion on this point, because we are convinced that a gun-cotton perfectly well adapted for all photographic purposes may always and easily be obtained by means of the reaction of ordinary sulphuric acid on pure nitrate of potassa. To complete our observations on the care necessary to be observed in the preparation of gun-cotton, we will observe that it is necessary to give the mixture of acid and salt a merely syrup-like consistence; it is not therefore necessary that there should be an excess of nitrate of potassa. Besides this, the immersion of the cotton should be made just previous to the advanced formation of the sulphate of potassa which very speedily thickens the mixture. But there is another and more powerful reason for immersing the cotton without the least delay, and this is, that its transformation into pyroxiline arises solely from the liberation of nascent nitric acid. Now, the production of this acid, which manifests itself with considerable violence at the first contact of the sulphuric acid with the finely powdered nitrate of potassa, very speedily slackens. It is especially efficacious during the first ten minutes, and this lapse of time is necessary for a perfect transformation of the cotton into pyroxiline. There is no necessity to regard the surrounding temperature. In winter, as in summer, the chemical combination of the two bodies constantly develops a normal heat with which one should be satisfied. It is always advantageous to operate with a small quantity of cotton at a time, say from a quarter to half an ounce, and extreme care should be taken to keep it beneath the surface of the syrupy mixture by means of a strong glass rod.

Preparation of Collodion.—So many formulæ have been published that we will not expose ourselves to the reproach of adding another to the list which is already of such formidable proportions. All these formulæ may be reduced to the association of the iodides and bromides with the normal collodion in fixed proportions. But is it really necessary to proceed always by such exact weights? We think not, for we have every reason to believe that, in a preparation of this kind, nothing more exact is required than a sound appreciation of its effects. Now the elements of this appreciation can hardly be given in figures, they exist rather in a peculiar tact and observation. Still, to avoid straying too far from the truth, especially in the beginning, we admit that figures are of a certain utility, but it will soon be found by experience that, in the subject under consideration, they have no positive meaning. Therefore the mode of proceeding we advise is as follows:—

Introduce about four parts of gun-cotton into a bottle containing 100 parts of good, but not rectified, sulphuric ether of commerce. After immersion for about an hour, the cotton-powder stirred from time to time becomes dilute, separates and falls to the bottom of the bottle, without being in reality dissolved. When this takes place a few parts of properly rectified, but not absolute, alcohol must be added to the mixture. The dissolution of the gun-cotton then becomes very visible; and it is still further stimulated by the addition of fresh alcohol, but it must be borne in mind that the total quantity of this latter substance ought not, as a rule, to exceed a fifth or a sixth of the weight of the other. It may often happen that this quantity may be exceeded with advantage; but in that case the rectification of the spirit must be carried higher. After standing for about twelve hours, the solution is decanted, which, seeing the excess of gun-cotton, we will suppose to be incomplete. It is necessary, therefore, to ascertain the consistence of the collodion obtained. It will evidently be too thick; and, to prove this, it is only necessary to pour a little of it on a clean plate and drain the excess back into the bottle in the usual way. When the film has set sufficiently, rub the film with the finger and the thickness will at once be seen. In the case we are supposing it will be found too thick, and must be attenuated by the addition of ether in preference to alcohol. We may mention, in passing, that collodion which is too thick, and which has been iodised, ought never to be attenuated except with ether: there would be danger in using alcohol. The fact ought not to be lost sight of, that a collodion rather thick at first acquires greater fluidity after keeping for a few days. Besides, in consequence of the greater or less extent of the glass and the surrounding temperature, the collodion film assumes a relatively variable thickness. It is, therefore, impossible to lay down precise instructions on this point; experience alone is the best guide. In general, a thin film is advantageous, especially for dry collodion; it adheres more strongly to the glass, and resists the different washings better. It is absolutely essential, however, that, when dry, it should be perfectly transparent. With bad ether or a too weak alcohol it will be milky; and when this is the case the preparation may as well be thrown away at once.

(*To be continued.*)

Lessons on Colouring Photographs.

COLOURING IN OIL—(*continued*).

Second Painting.—As we have before explained, much of the effect of oil painting is obtained by applying one coating of colour over another. As this cannot be done until the first colour is dry—and some hours, at least, are required for this purpose—it is customary to divide the work into three paintings. In some cases, the colouring might possibly be completed in two paintings, and in others, especially where very high finish is required, several more paintings will be desirable; but, in most cases, three will be found sufficient. It is of the utmost importance that the first colouring be completely set before the second is commenced, otherwise the colour will work up, and anything like purity or brilliancy will then be hopeless. The time required will vary according to the temperature of the painting-room, the nature of the vehicle used, &c.; but, in most cases, the colouring may be resumed each consecutive day. It will be obvious that some system must be used to get the whole of each separate painting done without smearing some part of it. To do this, it is necessary to commence at the top left-hand corner of the picture, colouring downward and to the right; by this means the work will be finished above the hand all the way.

Having ascertained that the first painting is thoroughly dry, take a soft, flat camel's-hair tool, charged with poppy oil, and pass it over the whole surface; after which, wipe away all superfluous oil with a piece of soft kid leather or silk. The effect of this "oiling out," as it is called, which is performed between each colouring, is not only to give softness to the work already done, but disposes the after painting to unite with that already applied.

Now, lay the palette with the following tints:—White and Naples yellow; white, Naples yellow, and rose madder; white, light red, and terra verte; white, Indian red, ultramarine, and raw umber; white, purple madder, and ultramarine; vermilion, raw umber, and rose madder.

It is important to have a duplicate copy of the photograph

at all times under the eye, a strongly defined print being best. Carefully consulting this, proceed to glaze the shadows with a tint appropriate to the complexion. In doing this, remember that the shadows of flesh in dark or sallow persons incline to green, or a greenish grey; in fair persons, they partake more of blue; and, in very florid complexions, they incline more to purple. Strengthen the lights, and blend them with the shadows, by means of delicate greys. Glaze the reflexes with a warm, transparent tint. If these are wanting in the photograph, they may be put in with a little white and Naples yellow, and subsequently receive warmth and transparency by appropriate glazing. Soften all hard lines about the face, especially the eyebrows and junction of the hair and forehead.

Proceed to the background, which may now be advanced to about the desired colour. This, as we have before said, will much depend for its tint on the complexion of the sitter, and the colour of the draperies; the hints we have given, in our remarks on the relations of colours, being borne in mind. Take care that the background is relieved by light and shadow, and that the figure does not cut it too hardly, especially about the head, or it will appear inlaid. For plain backgrounds, the following tints, properly mixed, will give a variety of good effects:—

Black, white, and Indian red.
Black and Indian red.
Black and burnt sienna.
Black, white, and lake.
White, raw umber, Indian red, and black.
Brown ochre, white, and burnt umber.
Prussian blue, black, and white.
Raw umber, terra verte, and burnt sienna.
Brown umber, yellow ochre, and lake.

Landscape backgrounds will require a greater variety of tints, depending on the nature of the objects introduced. For a sky, the following colours will be found useful:—French blue, or ultramarine, white, vermilion, Indian red, madder lake, yellow ochre, Naples yellow, and raw umber. It is necessary to observe, that the background of the photograph, on which to paint a sky, should be of a very light tint, as nearly white as possible, otherwise it will be impossible to paint a clear, transparent aërial sky. We would caution the beginner, however, against the background obtained by cutting out and masking the figure, as the hard outline thus produced would materially increase the difficulties of even the experienced painter. The intense blue will be, at the zenith, gradually growing paler, until it mingles with the rosy and yellow tints of the horizon. Avoid too blue a sky, and be careful, in graduating the tints of blue towards the horizon, not to produce a green one by mingling blue with yellow. Clouds will vary with the character of the sky. The following tints, variously combined, will often serve:—French blue, white, Naples yellow, Indian red, madder lake, black, and brown madder.

(To be continued.)

Photographic Chemistry.

In our last number we concluded the series of elementary articles on photographic chemistry, and we have no doubt that those for whom they were written will have benefited by the information contained in them, so as to have acquired a knowledge of the reason why certain effects are produced by the reaction of certain chemicals on each other. Not only is this knowledge valuable in itself, as enabling the young photographer to judge of the best method of remedying faults in the chemical substances he employs, but it adds greatly to the interest with which he watches the results of his operations. In the absence of such knowledge, photography is little more than a mechanical art, and he who practises it under such circumstances can never feel an intelligent interest in what he is doing, but only a feeling similar to that of the gambler who hazards a stake in the hope that it may bring him a prize, but has no control over the result, and is as likely to find it a blank, or something very little better.

In this series of articles we have purposely confined ourselves to a brief notice of the various substances treated of, as we wished to give a general idea of the chemistry of photography, but we propose, in future numbers, to go more into detail, and not to confine ourselves to chemical substances, but to treat of photographic manipulations and apparatus at greater length.

Dictionary of Photography.

Caoutchouc, or india-rubber, is the juice of many trees of tropical growth, hardened by exposure to the air. When pure it is nearly white—the dark colour of the commercial gum being due to the smoke in which it is dried. Its physical characters are too well known to need description. It is insoluble in water, although boiling water softens it and causes it to swell up considerably; it is also insoluble in alcohol. Pure ether, benzol, and chloroform dissolve it with facility, and, on evaporation, leave it unchanged. Oil of turpentine also dissolves it, but leaves it, on evaporation, as a viscid, sticky mass, which dries imperfectly. Caoutchouc is unaffected by most chemical reagents, such as chlorine, sulphurous acid, hydrochloric acid, ammonia, &c., and hence it is of the greatest use in the laboratory. Dilute acids neither dissolve nor attack it. Caoutchouc is becoming of more and more use every day. Advantage is taken of the adhesive nature of its surface to remove pencil and other marks from paper. In the laboratory it is employed in the form of flexible tubes for gas and other purposes, and in the form of thin sheets to tie over the stoppers of bottles containing absolute alcohol, or other substances, from which it is important that air be excluded; and, in the same form of thin sheets, it has been successfully employed as an illuminating medium for the dark room, permitting luminous rays to pass, but obstructing all actinic radiations. The solution of caoutchouc, in benzol or other solvent, is largely employed as a waterproofing agent; and its benzol solution also forms one of the best adhesive agents for cementing positive prints to the mounting board: for this purpose it should be of the consistency of treacle, and may be thinly smeared, with the finger or stiff brush, over the whole surface of the picture and mounting cardboard. When nearly dry, apply the two prepared surfaces together, and they will readily adhere, without giving rise to cockling. No particular precautions need be taken against soiling the face of the print or exposed part of the mounting board, as, when dry, friction with a clean piece of india-rubber will at once remove all dried portions of cement. Caoutchouc also enters into the composition of the black varnish used for backing positives, as its employment obviates the tendency to crack. The following is a good receipt:—

Caoutchouc	15 grains.
Asphaltum	2 ounces.
Benzol	5 ounces.

Dissolve by the aid of heat if necessary.

Carbon. An elementary body, solid, inodorous, insoluble, and infusible. It occurs in two very dissimilar crystallised states, the diamond and graphite; and in the amorphous or uncrystallised state, as lampblack, plumbago (erroneously called black lead), charcoal, anthracite, animal black, &c. The diamond is one of the most remarkable bodies known; its curious chemical nature having conferred upon it a high scientific interest, independent of its value as a gem. The diamond is applied to a very useful and necessary purpose by photographers, viz., cutting glass. A broken *fragment* of this mineral merely scratches the glass as a flint would, but a *crystallised edge* of diamond drawn along with a gentle pressure, causes a deep split to take place in the glass, which can then be fractured along the cut line with the greatest

accuracy. No photographer should be without a glazier's diamond. The comfort and convenience of having always at hand a ready means of cutting glass into a desired shape, far outweighs the slight expense of the instrument, and the necessary facility of manipulation is soon learned. In its amorphous state carbon is employed, as animal charcoal, for the purpose of removing the dark colour which a nitrate of silver bath assumes after being used for sensitising albumenised paper or glass; it is not a good material for this purpose, as it contains many impurities, which tend to impoverish or contaminate the bath. Kaolin, or freshly precipitated chloride of silver, is far preferable, as we have previously pointed out. Carbon printing, which has recently attracted some little attention at home and abroad, in consequence of the prize offered by the *Duc de Luynes* for a successful process, must, as far as regards those plans which have yet been made public, be regarded as a hitherto unsolved problem. Carbon unites with oxygen to form two compounds, viz., carbonic oxide—a compound of equal equivalents of carbon and oxygen, CO; and carbonic acid—a compound of one equivalent of carbon and two of oxygen, CO_2. The latter is the only oxide of present importance; and, as the compounds which it forms with bases are of frequent employment, we will consider them more in detail.

(*To be continued.*)

A Catechism of Photography.

EXPOSING TO THE ACTION OF LIGHT.

Q. What description of apparatus is necessary for the purpose of printing positive from negative photographs?

A. Two pieces of glass held together by wooden clips. The lower glass should be covered with black velvet, or cloth. Frames for this purpose can be obtained at any photographic warehouse; but the two pieces of glass answer perfectly well.

Q. How is the operation of printing conducted?

A. The glasses must be thoroughly cleaned; the negative photograph must then be placed in immediate contact with the prepared paper, and both be closely pressed together. The glasses which contain the paper must then be exposed to the light, and the perfect picture is gradually produced.

Q. What length of time is necessary for printing photographs?

A. This depends on the density of the negative and the power of the actinic ray; and the time may vary from ten minutes to an hour, or even more.

Q. As a general rule, are those photographs best which are printed rapidly?

A. No, the best negatives print slowly; and the best pictures are those which are very gradually developed.

Q. What is the colour of the photographic print?

A. The colour varies, being in a great measure dependent on the mode of preparation, and the length of the exposure to light.

Q. In what respect do the colours of photographs vary from each other?

A. Some are of a greyish blue, others of a lilac, others again of bluish brown, of black, of sepia, bistre, &c.; albumen produces a rich chocolate brown, and ammonio-nitrate paper a dark slate blue.

Q. How can the operator ascertain when the positive impression is sufficiently strong?

A. The frame may be opened and the proof examined; but when this is done, the utmost care is necessary in replacing positive and negative exactly in their previous position. The development of the picture must be regulated by a regard to the subsequent processes of toning and fixing. When the positive is removed from the frame the tints all appear darker than they are intended to remain. This is reduced by the toning bath. The acid toning bath acts more rapidly than the neutral bath of chloride of gold; and it is essential to take this into consideration with regard to the intensity of the impression.

FIXING.

Q. How is the permanency of the positive photograph secured?

A. By fixing.

Q. How is this operation performed?

A. On being removed from the printing frame the positive proof is plunged into a solution of hyposulphite of soda:—

Water	5 parts.
Hyposulphite of soda	1 „

Care must be taken to avoid the formation of air bubbles in immersing the photograph. On examination the transparency of the proof appears defective, and, in some parts, almost opaque, but this opacity rapidly disappears in the bath, and, after a few minutes, the picture becomes perfectly transparent, the salts of silver having been dissolved by the action of the hyposulphite of soda. The proof is then fixed; and if it were possible to preserve it in this condition after the various washings which it has subsequently to undergo, its permanent solidity would be secured.

Q. Is not the solution of hyposulphite calculated to secure the permanency of the picture?

A. No; unfortunately in the bath it takes a disagreeable tint, which has afterwards to be removed, and which removal cannot be effected without having recourse to other operations.

Q. How does this difficulty arise?

A. Through the hyposulphite of soda becoming, after a short time, so far saturated with the salts of silver as to contain an excess of hyposulphite of silver, which imparts to the paper a greenish colour, and an opacity of texture very difficult to remove. If the bath is new and pure, the salts of silver are rapidly withdrawn from the proof, but if this is not the case, the results are most injurious.

Q. How is this difficulty to be avoided?

A. By employing a new hypo. bath very frequently, and by not attempting to fix a large number of proofs in the same bath, but by allowing plenty of room for the proofs to float freely in the bath.

Q. How much of the silver is removed from the proof in the hypo. bath?

A. About ninety-five parts out of every hundred. Thus, five parts remain on the proof, and ninety-five are dissolved in the hypo. bath. It is obvious, therefore, that every operator, on the ground of economy, should recover the dissolved silver from his old hypo. bath.

THE TONING BATH.

Q. How is the toning bath prepared for positive photographs?

A. The formulæ given are numerous. The most simple is that of the neutral chloride of gold without the addition of any acid:—

Distilled water	1000 parts.
Chloride of gold	1 „

Q. Is the proof immersed in this solution previous to being placed in the hypo. bath?

A. Yes; on being removed from the hypo. bath the proof is thoroughly washed in clear water, so as to take from it every trace of hyposulphite of soda; it is then placed in the toning bath, and allowed to remain until the desired tint is obtained.

Q. Will it, in course of time, take any tint that the operator may wish?

A. It will take any of the photographic tints, such as we have already named, by a slight modification of the toning bath.

Q. Mention one of these modifications.

A. Very good results are obtained in changing red-brown

proofs to a bluish black, by the use of the following solution:—

Water	500 parts.
Chloride of gold	1 „

To this add—

Water	500 parts.
Hyposulphite of soda	200 „

About a quart of the fixing liquid being thus obtained, the proof, on its removal from the frame, is plunged into it, without the ordinary hypo. bath. This process answers well, but is expensive, as the fixing liquid is very soon unfit for use.

Q. What other formulæ are recommended for the toning bath?

A. In place of mixing the chloride of gold with the hyposulphite of soda, the crystallised sel d'or is sometimes used, in the proportion of half a grain to an ounce of water. The chief objection to this is the expense.

(*To be continued.*)

Correspondence.

THE STEREOSCOPIC EXCHANGE CLUB.

To the Editor of "The Photographic News."

Sir,—I am glad to see in the last number of the "News" that you propose to print a list of your subscribers who are willing to exchange stereograms with each other, and shall be much obliged if you will kindly insert my name and address in the proposed list.

I wrote to you some time ago on this subject, when you were good enough to insert a note in the "News" in which I offered to exchange a print or two with any amateur who had been working Fothergill's process, the result of which note was, that prints were sent me by the dozen from all quarters, at once proving the extended circulation of the "News" and the desire on the part of amateurs, at least, to adopt some means of comparing their productions with those of their brother amateurs.

Many of the prints sent me were desperate rubbish, and were at once carefully deposited in the fire, and though it was a hardship, I considered myself bound in honour to return an equal number of my own prints. Would it not be a good plan to suggest that each person desirous of having his name inserted in your list, should send you a print or two as a sample of what he proposes to give in exchange; and if such samples were not up to the mark, the non-insertion of his name would be a gentle hint that he ought to think less of his productions, and strive to do better for the future.

With my last communication, I sent you a couple of prints, which you were good enough to make a favourable note of, but in case you have forgotten the matter altogether, and acting on the foregoing suggestion, I again inclose you two prints; they are not what I consider my best productions, but simply an average sample of what I could send in exchange for any that might be sent me.

I would further suggest that the process by which the negative was obtained, should be noted on the back of each print, and the name of the sender; there will be no occasion for the address, as that can be obtained by reference to your list in the "News."

Your obedient servant,

Archibald Burns.

4, *Calton Hill, Edinburgh.*

[In accordance with the above, and other suggestions from correspondents, we may find it advisable to slightly modify the regulations which we published in the last number; in this case we intend publishing our amended suggestions in our next week's impression.—Ed.]

PRIZE MEDALS.

To the Editor of the "Photographic News."

Sir,—Long ere this reaches you, you will no doubt be aware that our prize medal adjudicators have awarded the medals to the most successful competitors, and that the fortunate—or unfortunate—recipients of these awards are respectively the Rev. T. M. Raven and Mr. Lyndon Smith, of Leeds. The former has carried away the "member's medal," the latter has received the "stranger's medal." As to the respective merits of the prize pictures, I will say nothing,—that is not my object in writing to you. You have in your capacity as journalist frequently had opportunities of reviewing the works of these gentlemen. Of the productions of the latter you have expressed a high opinion;—while of the former, in your review of the last exhibition, you wonder "what could have induced him to exhibit his two views—'Pierrefitte,' and 'View near Luz,' as there is not the slightest pretence to anything like detail in them." Now, I am not for one moment going to say anything about the photographs, or to say that there were not photographs in our exhibition quite as good as those to whom the awards were made. What I wish to do is simply to state that this prize medal system has been fraught with great evil, and has given a great amount of dissatisfaction. I wish you to write down the principle as a bad one; this I need scarcely urge upon you, since you have done so already. When the matter of prize medals was first announced, you stated in a most prophetic manner all the difficulties and annoyances which have attended it. In a series of articles entitled "Approaching Exhibitions," you with singular foresight threw out a series of suggestions which it would have been prudent to have acted upon, had the parties to whom they were addressed only paid attention to them. The first suggestion made in those articles was the necessity of an unqualified rescinding of a resolution passed by the Photographic Society, prohibiting photographs from the exhibition which had been exposed in the shop windows. This suggestion was fought against time after time by the society's journal, but ultimately the Photographic Society was completely beaten; they were obliged, at the last moment, to do as you suggested. In the same article you pointed out the difficulties of the medal question; while in a subsequent article you suggested the formation of a collection of photographs, showing the progress of photography from the earliest date down to the present. This passed unnoticed, until His Royal Highness the Prince Consort, seeing the great importance of such a step, took the opportunity of calling the attention of the council to the matter on the occasion of his visit to the exhibition, and now they begin to see the desirability of your original suggestion. Having made this slight digression, I now come again to the question of the medals, and again beg you to call the attention of photographers and photographic societies to the matter, and let them learn and profit by our experience here. I hope that the Edinburgh affair will be the last that we shall ever hear of the prize medal question.—I am, Sir, your obedient servant,

S. J. W.

Edinburgh.

Photographic Societies.

The French Photographic Society.

At the last meeting of the French Photographic Society, M. Regnault in the chair, after the election of certain members, M. C. Chevalier presented a series of proofs of different groups and studies taken in the East, by Col. Nostitz, in the Russian service, by whom they had been forwarded; and M. Delahaye did the same on behalf of M. Stalie, of Pernambuco. These proofs represented different types of individuals, monuments, and landscapes, taken in Brazil, and it is intended to hang them in the forthcoming exhibition.

A letter was then read from M. Cognacq (vide "Photo-

GRAPHIC NEWS," of vol i. p. 290. The following is in substance the reply of MM. Davanne and Girard:—That they had never pretended to have discovered a new property in chloride of calcium; and that, in addition to that substance, they mentioned chloride of zinc, carbonate of potassa, and generally all hygrometrical substances, the existence of which has been long known. What they showed was, that prepared paper kept in a place perfectly dry, and protected from light, would keep good for an indefinite period. Also, they claimed priority in the discovery of the use of chloride of calcium, inasmuch as, even if M. Cognacq was the first to use it, he kept it a secret. M. Paul Perier then read a letter from M. Marion, in which, after refuting the accusations made against him, of having appropriated M. Cognacq's discovery by deception, he concluded thus:—"I don't pretend to ascribe to myself the discovery of the use of chloride of calcium, and its preservative action on nitrated papers. I leave this to whom it belongs of right. I have merely invented a convenient apparatus, an invention which nobody can dispute with me, and for which I have taken out patents in France and England. My invention consists chiefly in a frame furnished with a wire, cloth, and muslin on one side, in which I place the chloride of calcium, which is kept there by means of folds of paper, which are fastened on the opposite side by means of a sheet of zinc or pasteboard. This absorbent is fixed in the box in which the nitrated paper is to be preserved. I have made boxes of tin, closing hermetically, and properly arranged for receiving the absorbents; but those who desire to make their boxes themselves can buy these absorbents of me very cheap, and ready prepared. It should be thoroughly understood that my invention rests specially on the apparatus. Now that I have given these explanations, I will add a word on the observations I made in trying the apparatus I have constructed. I observed that the absorbing action of fused chloride of calcium is not so great as that which is merely dried. Hence it results that the paper which was placed in the box I deposited with the Society two months ago should be less perfect than if it had been placed in one of those I make now, because in these it is the latter kind of chloride of calcium which I use, having found it much preferable to the other."

The following report was then read by M. Paul Gaillard, in the name of the commission appointed to examine and report on Marion's preservative apparatus:—

"Gentlemen,—You have charged us, MM. Bayard, and myself, with the task of opening the boxes intended to preserve the sensitised paper, deposited by M. Marion at the last sitting of 1858. The following is our report on the paper it contained:—

"A month after preparation, the non-albumenised chlorided paper was preserved almost white; the albumenised papers had all acquired a more or less nankeen colour, but which did not seem to detract at all from the value of the positive proofs, especially when the precaution was taken to pass them in the iodo-cyanide bath after the hyposulphite as suggested by M. H. de Molard. In preserving the paper but eight days, and without opening the box during that time, the paper was sensibly white; and after the lapse of two months it still yielded a satisfactory proof.

"As to the negative paper, we took a proof on waxed paper which had been sensitised a month, and we found no difference between it and that sensitised on the previous evening.

"The process appears to us to be destined to render important services to photographers, by allowing them to prepare at one time a certain quantity of paper, without fear of losing it if time or pressure of business will not allow of its being used directly."

The commission proposed that the thanks of the Society shall be given to M. Marion for his communication, which was accorded.

M. Mailand then read a report on the financial position of the society; at the same time presenting a balance sheet of the accounts in all their details. This report showed that the finances of the society are in a flourishing condition. As a consequence of this prosperity the committee of administration proposed—

1. The foundation of a reserve fund formed of six-tenths of the balance of the receipts.

2. The foundation of a special fund for prizes and encouragements, formed

a Of three-tenths of the balance of the receipts.

b Of the net product of the public sale of the proofs given specially for this purpose.

c Of donations.

3. The foundation of a relief fund, formed of one-tenth of the balance of the receipts, and of donations.

These propositions were put to the vote and carried. After which a certain number of the retiring members of the committee of administration were re-elected.

M. Le Gray next presented some proofs toned by the process described at p. 253, vol. i. of this journal, and accompanied it with certain explanations which will be given in our next impression.

MM. Davanne and Girard also read the continuation of their paper on photographic positives; for which they received the thanks of the society.

The next communication was from Mr. Maxwell Lyte, and related to the conditions of the sensitive film in all negative processes, whether on collodion or on paper; it was as follows:

"I believe MM. Barreswil and Davanne were right when they showed that it was not the iodide of silver, but the nitrate which was in contact with the iodide, which by its decomposition produced the blacks of the image. But I go even further than they. It is probable that the iodide of silver, when it is dissolved in a nitrate bath, forms a chemical combination with the latter, and to demonstrate more clearly the existence of this combination, it ought to be mentioned that by adding iodide of silver to a highly concentrated solution of nitrate, the iodide is dissolved, but that after the lapse of a few minutes the greater part is re-precipitated under a crystalline form, and even that which is not dissolved becomes crystalline after the lapse of a certain time. I believe that a similar combination is found in the sensitive film, but amorphous instead of being crystalline. Indeed, the same sensitive properties are found in both the amorphous and the crystalline when the proof blackens in the developing bath after exposure to the light. Only the crystalline deposit is not so sensitive as the amorphous, owing, perhaps, to its crystalline condition.

"Under these two forms the *iodo-nitrate* (if we may so term it) decomposes instantaneously if an attempt be made to wash it in water; consequently it cannot be deprived of its excess of nitrate of silver, and therefore cannot be analysed.

"In washing the crystalline iodo-nitrate with water, it loses its nitrate, becomes a powder, and insensible to the light; by washing the amorphous iodo-nitrate of the sensitive film for a long time it loses its sensibility and becomes paler in proportion as it loses its nitrate. It is to be remarked also that the excess of iodide of silver, in presence of an excess of soluble iodide, is of a pale yellow; while the same iodide, in presence of an excess of nitrate of silver, becomes of a deeper yellow and much more brilliant.

"I consider, as I have just explained, that the iodo-nitrate exists under two conditions: the one crystalline, the other amorphous; and that this latter, which is found in the sensitive film on its withdrawal from the silver bath, is that which gives it its sensitive properties; and thus it is necessary to shield it from decomposition when it is desired to preserve the film in a sensitive condition. Here you have the reason why practice has laid down certain rules for the preparation of the collodionised film, and for its preservation in the sensitive state.

"We ought not to employ a nitrate bath, the richness of which is greater than 7 per cent., otherwise the iodide dissolves, and is reprecipitated in a crystalline state. Neither, for the same reason, should the glass be allowed to dry with the excess of the bath on its surface.

"The glass cannot be washed in water without danger of altering the iodo-nitrate on its surface, and of destroying its sensibility. Hence the employment of substances like honey, metagelatine, albumen, and mucilage, which can, by their syrupy condition, envelop the molecules of iodo-nitrate, and shield it from being washed off with the excess of free nitrate."

. . . .

The thanks of the Society were accorded to Mr. Lyte.

At the termination of the reading of Mr. Lyte's communication, M. Girard pointed out that M. Alfred Riche published in May of last year in the *Journal de Pharmacie et de Chimie* a note in which he described the preparation, and gave the analysis, of an iodo-nitrate of silver of the formula $Ag\,I, 2\,Ag\,O\,N\,O_5$, obtained by him by simply dissolving the iodide of silver in the nitrate of this metal.

M. Gaumé addressed a note on the method employed by him for the preservation of nitrated papers, and on the application to the obtaining of negatives, of the method he has already made known for the preparation of positive proofs.—*Condensed from the Bulletin of the French Photographic Society.*

Photographic Notes and Queries.

PORTABLE TENT.

SIR,—As you appear always willing to insert in your useful journal any real improvement relating to the chemical or mechanical department of photography, I send you a description of an extremely portable and effective tent. I have been using it for more than a year and a half. It will carry the tripod stand, a whole plate camera, and more chemicals than can be used in a day's work. I have two racks for the bottles, and, as I know what it is to be hard up in the field, they are five ounce ones, and consist of collodion, bottle varnish, cleaning solution, ether, cyanide of potassium, and beaker for pouring on the developants; the other rack contains two eight ounce bottles for developant and fixing solutions. After much practice I find that with those chemicals I am never at a loss; but I should not like to start on an excursion with less.

The apparatus consists of a folding tripod stand, on which the tent is fixed to suit the height of the person using it: it is a box made very lightly, the ends only being of half-inch stuff; the outside measurement is, length 25 inches, breadth 18 inches, and thickness 6½ inches; at each corner there is an upright hinged, the right-hand one folding over the opposite one, and when it is going to be set up, the lid is supported by one hand, whilst the other fixes the uprights, which, when raised up, fit into holes in the lid, which, being held down by the intervening two thicknesses of yellow, and one of black calico, the whole is quite firm. In the front side of the calico, a large hole is cut having a strip of velvet about six inches wide, with strong elastic at the inner edge sewed to it, through which, when working, I thrust my head and shoulders, and being buttoned up in two places, the light is quite excluded; at least, I and others have taken many brilliant pictures with it in the brightest sun without the least sign of fog about them: in the lower side at the back there are two windows of yellow glass which enable you to see perfectly, and there can be an opening cut in the black envelope if thought necessary. When fully packed with the whole plate camera, and its bath inside, and the tripod strapped on the top, the weight is about two stone, and I can carry it on my back like a knapsack by means of two broad straps; the camera tripod, which I take in my hand, assisting me in getting it on. I have frequently gone a distance of three or four miles and back, carrying everything myself, without feeling tired. The box for greater security is covered with oil cloth, and bound at the corners with metal.

S. MADDISON.

WATERPROOF AND LIGHTPROOF MATERIAL FOR TENTS, &c.

SIR,—Perhaps some of your readers would be glad to know of a method of preparing, at a moderate price, a perfectly light-tight and waterproof material well suited for covering portable tents, &c. I can confidently recommend it to the attention of the writer of the article entitled "The Wet *versus* the Dry Process," which appears in the first number of your second volume, for it is equally well suited for a waterproof coat. Boil *Stockholm tar*, and keep it at a boil for about a quarter of an hour; let it cool, but before it becomes cold enough to be too thick, add, little by little, good spirits of wine, in sufficient quantity to bring the mass to the consistency of oil paint. When quite cold apply with a paintbrush, and in the same manner as you would paint, a *thin* coat on whatever material you select; do not apply a second coat till the first is thoroughly dry; and finish with a third. It will take some days for each coat to dry properly, and the material had better be hung up in an outhouse, where it can get air, *but be protected against dust.*

The smoother and finer the material is upon which this coating is spread, the better the result will be; and a rough foundation requires even four and five coatings before it is what I call finished. I find for an *over-all coat* that "half-crown linen," as it is called, answers best, being nice and fine on the surface, light, and, consequently, more portable when finished. Silk would be the best of all, though dear; but common cotton stuff can, by four coatings, be made good enough for many purposes. Care should be taken in boiling the tar, that it is not done too quickly; as, if it boils over, and, consequently, takes fire, it is a most dangerous thing to deal with—almost impossible to extinguish. The boiling had therefore better be done in the open air, by making an impromptu fireplace with a few stones. I had this receipt from an old navy officer, and I have often proved its efficacy under a coat of his preparing, now in constant use for six years, and, seemingly, as good as new. GEO. DUNN.

OBTAINING PHOTOGRAPHS OF CHALK DRAWINGS.

SIR,—Will you kindly help me out of a difficulty? I have a number of large chalk drawings of landscape scenery to copy on the half-plate size (negatives), and I find considerable difficulty in getting the negatives sufficiently intense with the proper amount of exposure; the white margin of the drawing and the sky come much too transparent, so that, when a print is taken, there is no purity in the whites, and the proof presents a dirty appearance. If I expose a less time, I get an intense negative, and the margin and sky black enough; but then I find the deep shadows are all under-exposed, and there is no half-tone, and the print does not properly render the drawing; so that I find, when I expose just the right time to give half-tone and the proper amount of strength in the shadows, the sky is over-done, and the white margin also.

Now, how can I obtain proper gradation and yet keep the sky and margin sufficiently intense in the negative to print clean. I use a combination portrait lens, 3¼ inches in diameter, with stop in front the size of a shilling, and develop with pyrogallic acid, 1½ grains to an ounce—if stronger, it does not appear to give any better result.

A. B.

[The plan which we think will answer our correspondent's purpose best, is:—Employ a nearly colourless collodion, containing a *bromide* in addition to an iodide, as recommended in previous numbers of the "PHOTOGRAPHIC NEWS." Expose a sufficient time to bring out the half-tints; develop with positive developing solution prepared with sulphate of iron; and, as soon as all the half-tones and detail are well out, wash off and fix; then wash very well, and pour on and off several times a mixture of pyrogallic developing solution, and a few drops of nitrate of silver: this will increase the intensity to any desired extent, and will, we think, entirely obviate the difficulty complained of by our correspondent.—ED.]

MR. LYTE'S NEW GOLD TONING PROCESS.

SIR,—Oblige me by pointing out the cause of failure in the inclosed proof. It was toned by Mr. M. Lyte's process ("PHOTOGRAPHIC NEWS," vol. i. p. 301), and for the first hour everything seemed most satisfactory. It was removed from the toning bath when of a rich purple colour, and in the fixing bath (fresh hypo.) assumed a rich brown; but on proceeding to wash it, and after a few changes of water, it was found in the ruined condition in which you see it—the sky and water being utterly spoiled. I feared to keep it longer in the toning bath as I did not wish to obtain the black or grey tone. Everything would have been satisfac-

tory about this had not this abominable mealiness and discoloration supervened.

The mischief looks vastly like sulphide of silver; perhaps the print ought to have remained longer in the fixing bath.

A Wax-paper Man.

[The fixing bath was either not strong enough, or the hyposulphite of soda was not pure. The granular discoloration in the pores of the paper is owing to the presence of sulphide of silver arising from the decomposition of the hyposulphite of silver in the pores of the paper before the excess of hyposulphite of soda dissolved it out. It is an occurrence frequently met with, and is to be obviated by employing a stronger fixing bath.—Ed.]

SLATE BATHS.

Sir,—Observing in a recent number of your paper that one of your correspondents alludes to slate baths, I beg to send you the plan of one I constructed some time since. It has, I think, three good points—simplicity, cheapness, and strength, and is made as follows:—Take two slabs of thin slate, say about $\frac{3}{4}$ of an inch larger at the sides and bottom than you intend the interior of the bath to be when finished; up each side of both slates and also along the bottom, say about a $\frac{1}{4}$ of an inch or so from the edge, drill a few holes through which thinnish screws can pass, then take a piece of gutta percha and mould it about $\frac{3}{4}$ of an inch wide, and as thick as you desire to separate the sides from each other (about $\frac{1}{4}$-inch at the top and $\frac{3}{8}$ or $\frac{1}{2}$ an inch at bottom is a good size); the gutta percha is then cemented round the sides and bottom of the bath, between the two slates, and, to make all secure, a strip of wood is placed at each side and screws passed through the holes in the slates and through the gutta percha from side to side, taking care, of course, not to screw up too hard, or the slate will break.

J. I. H.

PENETRATING VARNISH.

Sir,—One of your correspondents asks for a formula of a penetrating varnish: the above I am not able to give, but a substitute, which will answer his purpose equally as well, if you think it of any use.

After taking a picture by the alabastrine process, and varnishing with the chloroform and amber varnish, you can *sink* any amount of colour by holding the bottle containing the varnish in your hand to make it warm, and then pouring *the vapour* on the coloured surface, which immediately penetrates it, so that the colour will be as plain on the reversed side as upon the collodion side; by re-colouring and sinking two or three times in succession, you can get any amount of intensity of colour.

W. J. W——n.

RESTORATION OF EXPOSED DRY COLLODION PLATES.

Sir,—In reply to your correspondent "Durham," vol. i. p. 249, I beg to state that the length of time occupied by exposed plates in returning to their normal condition is such as to preclude the practical application of the system in the restoration of plates accidentally exposed.

It would indeed be a very undesirable condition if it occurred quickly, as plates could only be kept a limited period between exposure and development.

Your correspondent will, however, be glad to learn that dry plates admit of very simple and expeditious restoration to their sensitive state by wetting them with a dilute solution of nitric acid, say one ounce to twelve of distilled water, and permitting them to dry spontaneously.

Hill Norris, M.D.

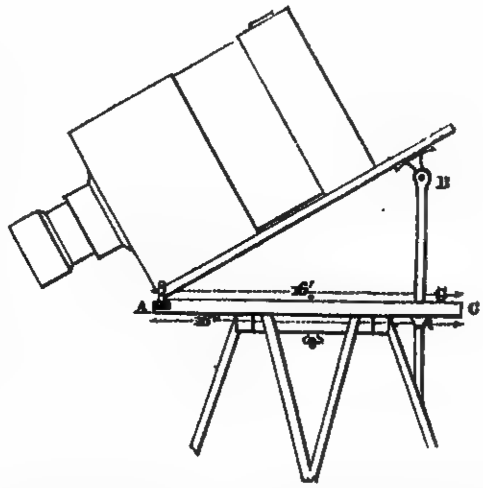
STAINED FINGERS.

Sir,—Finding that a remedy for stained fingers is still a desideratum amongst ladies and gentlemen practising the charming but rather "black art" of photography, permit me to suggest to them to remember that "prevention is better than cure," and to exercise their chemical skill in devising "*a collodion*" wherewith to coat the tips of their lovely fingers before they begin to work, and a solvent to remove it, when the dressing bell rings for dinner.

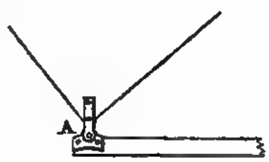
Suggestor.

APPARATUS FOR DEPRESSING THE CAMERA.

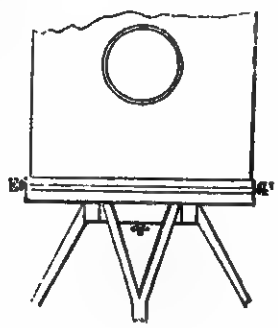
Sir,—Thinking that many of your readers may have suffered an inconvenience arising from not being able to depress the camera sufficiently, as, for instance, in taking views from windows of any height from the ground, allow me to send you a small contrivance for obviating this difficulty.



A C consists of a deal board 16 inches long, and 8 inches broad, with a round hole at q through which slides a long piece of wood, fastened by means of a ball and socket joint to the tail-board of the camera. E and F are two brass loops through which, and two similar ones on the camera, passes a long iron acting as a pivot.



Enlarged view at A.



Front elevation at A.

By this means the camera can be depressed to any required angle.

A. W.

ANSWERS TO MINOR QUERIES.

Testing the Purity of Wax.—*A. Henderson.* Wax is one of those articles of commerce which is very generally adulterated. Indeed, as usually met with in the form of thin round tablets about 4 inches diameter, it is not an uncommon thing to find it adulterated to the extent of *at least* 50 per cent. The following method of testing wax for impurities, is taken from Bolley and Paul's excellent "Manual of Technical Analysis." The probable impurities and adulterations are:—*tallow*, indicated, when the amount is considerable, by the inferior consistence and greasy feel of the wax; by the absence of granular fracture; and by the taste when chewed. The distillate from wax, containing only two per cent. of tallow, gives, when shaken up with water and filtered, a liquid from which acetate of lead throws down a precipitate, while this is not

the case with pure wax. *Stearic acid*, indicated, when the wax is boiled with lime water, by a precipitate—stearate of lime—that remains suspended in the liquid, and by the neutralisation of the lime. *Resin*, indicated by the inferior brittleness of the wax and by its adhesiveness. The resin is separated by alcohol. *Starch* or *meal, earthy substances, &c.*, indicated, when the wax is dissolved in turpentine, by an insoluble residue, which is further examined to ascertain its nature. In order to estimate the amount of stearic acid in adulterated wax, a known quantity is boiled for a few minutes with a solution of carbonate of soda in 50 parts of water, alcohol added until the liquid becomes clear, the insoluble portion separated by straining through linen, washed with water, melted, and weighed. The loss of weight represents stearic acid.

Splitting a Positive Print.—*Despair* has succeeded in staining the back of a valued positive print in such a way that the marks show through and disfigure the lights of the picture; and asks our assistance in suggesting some remedy before the print (which cannot be replaced) is mounted. Our correspondent is fearful of employing cyanide of potassium, as a preliminary experiment on another print showed that there was a likelihood of the cyanide eating away the picture through the paper. The only plan that we can suggest to our correspondent is, to *split* the sheet in half. Mr. Leighton, who was, we believe, one of the first persons who succeeded in dividing a sheet of paper, has given very clear directions how this is to be accomplished; he states that two leaves of paper harder and slightly tougher than the one to be split are to be obtained; the three are then to be firmly pasted together (*à la* sandwich) with stiff clean paste free from lumps. Rub them well when first placing them together, in order to get rid of air bubbles, and allow to dry spontaneously in a moderately warm room. When quite dry, gently draw apart the two outer leaves, and if care be taken to *start* the splitting of the inclosed sheet fairly, it will divide equally, leaving one half firmly pasted to each leaf. It now only remains to soak the papers in warm water until the paste is softened, when the thin split sheets may be removed, washed, and dried. We should think that if calotype negatives were treated in this way, they might be much improved, as half of the paper with the irregularities and opacity would be removed.

TO CORRESPONDENTS.

Proposition for Exchanging Stereoscopic Pictures.—On the 8th of April we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed, a picture be forwarded with it. We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score. The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

E. P.—The reason of the mottled appearance on your print is, that you have not a sufficiently strong nitrate bath in making it sensitive; you should have followed *all* the formula at vol. i. p. 298.

H. Manley.—We are much obliged for the extract about Mr. Hill's process for daguerreotyping in natural colours. His process is an *American* one; and has been shown long ago to be incapable of effecting what it promised.

Count Wengierski.—Received.

H. S. I.—Received; it shall be inserted. Your two queries will be answered in our "Minor Queries."

T. T.—1. The nitrate of silver could not have been pure; otherwise a new bath with so much nitric acid in it would not have given foggy pictures. As a remedy, try sunning it, as described in our first volume. 2. The front lens of a portrait combination may be used for landscape photography if fitted into an appropriate mount, with the convex side turned towards the ground glass of the camera; but such lenses are not so good as those made especially for landscape purposes.

Kalos.—1. A single lens. 2. Aplanatic. 3. Yes; but we do not know the publishers. We would willingly give prominence to the paper process if such were the desire of our readers; but we find that for one advocate of the calotype process there are a hundred glass photographers. Perhaps if "Calotype" were to give us the results of his experience on paper, he might win over others to give his process a trial. For our part, we are great admirers of a good paper negative.

Photo. Beyond Railways (answers to queries on the bichromate of potassa process, vol. i. p. 282).—1. Thin starch paste either brushed or floated on for a minute or two. 2. It may be ironed. 3. A saturated solution of iodine in water (very little will dissolve). 4. The blue tint will be produced as soon as the iodine comes in contact with the starch. The subsequent washing is merely to get rid of the excess of materials used. 5. A saturated solution may be used. Dissolve 1 part of bichromate of potassa in about 10 parts of water. 6. More analogous to the developing agent. 7. The gallo-nitrate solution will not keep good many minutes; consequently only sufficient should be made at one time to serve for present use. 8. We have reason now to believe that the *biased* discovery of the Lyons chemist, was a *canard* of one of our foreign contemporaries.

J. C. Twyman.—We are much obliged for the three instantaneous stereograms. They are very beautiful specimens of marine photography; although not, perhaps, so rapidly taken as some which we have seen. A description of the process employed would be of interest to our readers, as the manipulations for instantaneous photographs are not generally understood.

Viator.—Our correspondent's ideas and suggestions on the subject of Photo-Topography are very good, but hardly in a sufficiently connected form for us to lay before our readers. If he will favour us with a letter showing how the suggestions might be best carried out, we shall be greatly obliged.

O. G.—We have heard many good accounts of the lenses, but having never practically tried them, we cannot give much of an opinion on the subject. The curvature of the field is rather large according to your experiment, but, as you say, the imperfections arising from this will be in some measure remedied by using smaller apertures.

A Pupil of the "Photographic News."—Received with thanks.

A. R. P.—Send a stamped and addressed envelope, and we will communicate with you.

A Positive Man.—Most of the hints on stains and streaks, which are given in our remarks, will apply to collodion positives as well as negatives.

Z.—There would be objections to the plan you suggest which more than outweigh the advantages.

J. C.—1. We prefer the bellows form of camera; it will do very well for portrait purposes if provided with a double combination lens. 2. The aplanatic.

R. H. V.—All your questions have been fully answered in our first volume. Consult the index.

H. H. Allan.—Shall we insert your name in the "Stereoscopic Exchange Club," now forming? Your pictures are very beautiful, and speak well for the process you employ. Is it one of the usual processes or a modification? If so, we should like to lay the particulars before our readers.

J. W.—The substance obtained would be metagelatine, if you followed the instructions given by Mr. Hesch.

H. Eldridge.—Try the amber and chloroform varnish.

A. X.—We think that many superior developing boxes or tents have been from time to time communicated to our columns.

Quiz.—1. It will keep until the gold is exhausted. 2. Send your prints to a wholesale stationer's, who will hot-press them for you.

T. Tedrake.—Your letter is received with thanks; but as that subject seems now satisfactorily settled, we think no good would arise from a renewed discussion.

J. C.—Your suggestions shall receive consideration.

Dr. Tamers.—Received.

H. E. N.—Received.

A Photo.—From the description you give of the appearance (which, however, we cannot clearly understand), we should imagine your bath required acidifying.

E. J.—1. The effect you describe can be produced by using a perfectly black background. 2. We regret we cannot give you the particulars you ask for. 3. Photographic chemicals should be kept cold and in the dark, as a general rule, although exposure to light will not injure some of them. The operating room and baths therein should be of a comfortable temperature, neither too warm nor too cold.

W. Brooks Reynolds.—Received.

Ignoramus, will receive a reply in our next.

Nitric Acid.—1. 30 grains of salt to the ounce of water. 2. 30 parts of nitrate of silver to 100 parts of water. 3. The chloride of gold should be neutralised with carbonate of soda. 4. The Spanish white is for the purpose of neutralising any acid which may possibly be formed in the bath; chalk will answer the purpose equally well. 5. Add two or three ounces of salt to a gallon of water.

Sangee.—1. We cannot account for the appearance in the least; some of your chemicals must be impure. 2. The toning bath is unfit for use, and should be discarded in favour of a fresh one.

M. H. Crusy.—From your letter we imagine that you have been trying to obtain negative with positive collodion and developing solution. This you will find great difficulty in doing at first, although an experienced operator might sometimes succeed. The nitrate bath should be very faintly acidified with acetic acid, and the ordinary pyrogallic developing solution (as given in previous numbers) should be used; do not try citric acid for the present, but use acetic acid.

Anna Photo.—See article on *Copying Camera* (vol. i. p. 132), also articles at pp. 72 and 294 in the same volume. This is all the information we can give from your rather vague question.

J. H., Jun.—Your chloride of gold was acid: make it perfectly neutral, or even slightly alkaline with carbonate of soda, and you will find the bath will work well. We think, from your short description, that your developing camera must be a very good one; and we shall be pleased to receive an account such as you promise.

J. C. Dear.—Received with thanks.

A Beginner.—The annoyance of blisters in collodio-albumen is one of the great drawbacks to beginners in this beautiful process. Several practical hints on this point have been given in our first volume by experienced operators, and we cannot advise our correspondent to do better than follow their directions.

A Subscriber and Well Wisher.—A receipt identical with yours was published in our pages, vol. i. p. 66. We are, however, much obliged for your courtesy in sending it.

T. Clark.—Received with thanks.

Communications declined with thanks:—Post Office.—A Sanderson.—A. P. C.—S. E. N. O.—Hypo.—J. T. P.—Alhambra.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Mr. J. A. M.—A Beginner.—X.—Sheffield.—T. D.—Sugar of Lead.—Photo.—Seneca.—M. T. L.—V. E. Sams.

In Type:—H. Bellini.—Γ. Δ.—P.—John Rowlinson.—W. L. Scott.—An Amateur.—P. H. Innes.—Spanish White.—T.—Beta.—Multum in Parvo.—X. P. R.—T. Gulliver.

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*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 30.—*April* 1, 1859.

THE EFFECTS PRODUCED BY ENLARGING THE APERTURE OF THE PHOTOGRAPHIC LENS.*

BY THOMAS GRUBB, ESQ., M.R.I.A.

Before entering upon the subject of the present communication, it may not be amiss to remove any misapprehension which may have arisen from the title given. I am not going to enter at present upon the question which has given rise, in other localities, to rather angry discussion, viz., that of the fitness (or unfitness) of portrait lenses of larger apertures for the work for which they are intended, although this branch of the subject is one which the section of fine arts in conjunction with the Photographic Society seems highly fitted to discuss. Neither do I purpose to revert to another branch which I have already treated in a paper published in the London *Photographic Journal*, viz., the *inevitable* definiteness of focus of a lens, corresponding to its aperture and focal length. The present paper is intended to be confined to the consideration of those effects in the photographic picture depending upon varying the aperture of the lens, this aperture being (comparatively speaking) small, or, in other words, ranging between the largest and smallest aperture used with a "view" lens.

Photographers in general recognise two effects (only) as produced by varying the aperture of the lens, viz., increased distinctness, combined with slower action, by a lessening of the aperture, or these same inverted by increasing it; thus, we not unfrequently hear it asserted that when "still life" only is to be copied it is of little consequence how small the aperture used is, as, by giving increased time of exposure to the sensitive surface in the camera, the resulting picture will be similar in all points to one obtained by using a larger aperture of the lens, and giving a shorter exposure to the sensitive surface.

It is this commonly received opinion which, as I deem it to be erroneous, I desire here to combat. I apprehend that, as photographers become convinced that *there is* an effect due to aperture, their pictures will become more artistic—that we shall have pictures which have been taken in sunlight, *to represent such*, rather than moonlit ones—that we shall have photographs giving more of breadth and solidity in the foregrounds, and air and perspective in the distances—in short, that we shall have more of a picture and less of the present peculiarity of the photograph.

A photographer prides himself on the truthfulness of his work in its details. This is very well in itself, but it should cause him to recollect that such as is the image given by his camera, such should be expected in the general effect of the photograph derived from that image. Now let him place his camera, on a fine bright day, before, say, a landscape, and, if possible, *within a room*, or at least so that instead of examining the visual picture bit by bit with the discomforting aid of a focusing cloth, and perhaps with the addition of a magnifying glass, he shall be sufficiently removed from the light to take a general view of the visual picture as received upon the greyed surface; and let him also provide an assistant to change the stops, without requiring himself to leave his post at the camera. Matters being so arranged, let him observe the visual picture or images as produced by various apertures, which latter should range in diameter from at least $\frac{1}{15}$th of the focus of the lens for the largest—*e.g.*, 1 inch diameter for 15 inches focus of lens—down to the least he desires, even to that lately proposed to be used with an improved (?) lens, viz., $\frac{1}{8}$th of an inch diameter for a focus of 8 inches, or say $\frac{1}{64}$th part of the focus, and, the results being noted, I think there will be but one opinion, viz., that each step in the reduction of the aperture of the lens is accompanied, not only by a reduction of the brilliancy of the images, but by a distinctive difference in the character of the same—there being an evident loss in the vigour, the solidity, and the distances of the several parts making the picture.

Now, laying aside the camera, let a similar course of experiment be performed with the *eye*, for which nothing more is required to be provided than a series of holes, well blackened, in a thin plate, varying from, say, $\frac{1}{5}$ to $\frac{1}{64}$ of an inch in diameter. Precisely similar effects, perhaps more striking, will be observed by viewing the sunlit landscape with one eye, and using the varied apertures, as in the previous experiments with the camera and its varied diaphragms.

If further proof in the same direction be desired, we have this in both the telescope and the microscope. With the former the moon will afford a striking illustration. In proportion as the aperture of the object glass is reduced by diaphragms, the image assumes a map-like appearance; while, on the contrary, as the aperture is increased, those mountains of our satellite where light and shade prevail stand out in bold relief.

The microscope gives evidence to the same effect. The best object glass of such, sufficiently "stopped down" (or reduced) in aperture, gives sharp outlines, it is true, but the effect (or appearance) of solidity is lost.

Lastly, we have the evidence given by photographs themselves; to illustrate which some are exhibited taken with apertures greater than those in ordinary use. I think it will be admitted that these afford evidence of that which I have undertaken to prove. Doubtless, it would have been still more convincing could I have placed before you photographs of the same view, and taken as nearly as possible under similar circumstances, but with diaphragms of varied apertures; but this I have not had either time or opportunity lately to accomplish.

* Communicated by the Author; having been read at the last meeting of the Dublin Photographic Society, Friday, March 25, 1859.

ACETIC ACID IN THE POSITIVE SILVER BATH.

Since my last communication on "Positive Printing" (vol. ii., p. 15), I have received several inquiries as to the addition of acetic acid to the silver bath. In answer to these I beg to state that to *each ounce* of the solution I add 8 or 10 drops of acetic acid; but as this is directly against the opinion of some of the highest authorities, can you find space for an attempt at justification?

Firstly, some writers declare that its use causes spots when the print is put into the fixing solution. This may be, if the print is removed from the frame into the hyposulphite without any previous washing; but, if the print first goes through plain water and then is submitted to the ammonia solution, any further action of the acetic acid is certainly prevented; nay, I go further than even this, and say that after common washing the print *never does spot* when fixed, with my method of printing. I never had a print that spotted in the fixing solution out of thousands which I have printed with acetic acid, and as it does not injure the pictures, let me state my reasons for using it.

Many of the hand-books say that it is best to prepare as much printing paper as will be used in one day only, as it discolours if kept longer. If this rule were to be observed what a tedious and expensive process it would be to print a quantity of proofs from one negative. How often does the bright morning suddenly change to a cloudy day, and no light of any power show itself for three or four days! Here we should lose all the paper prepared. But as I stated in my short notice, the printing sheets will keep a week without any loss of brilliancy or whiteness, and this I ascribe chiefly, if not altogether, to the addition of acetic acid. I have been asked many times how I keep the *whites* so pure in my prints, and this also I believe is the effect of the acid.

Again, the crystals sold as pure nitrate of silver are sometimes strongly alkaline; in this case the bath would not be at all suitable for albumenised paper unless some acid were added.

That the acid does not necessarily injure the paper is strongly proved by the acid which is (and *must* be) added to the nitrate solution used in *Positive Printing by Development*. In this process the print is only rinsed and then fixed at once. No spots ever appear in this process, nor in the calotype sheets where a very large quantity of acid is used.

If there is any drawback to the use of this acid, I think it is probable that it makes the printing paper a little less sensitive—perhaps, scarcely perceptible—but this never seems to have occurred to the mind of any of the writers on the subject.

I can only add, in conclusion, that it may seem presumptuous to lift my voice against so many, but my practice and results so flatly contradict these slanders against acetic acid that I still use it, and I am, I believe, as successful as those who have dispensed with its services. Θ

AN ACCOUNT OF SOME COMPARATIVE EXPERIMENTS BETWEEN THE LENSES OF M. VOIGTLANDER AND PROFESSOR PETZVAL.

Without having the most remote intention of opening our columns to a barren discussion of the differences between M. Voigtlander and Professor Petzval, we could not refuse an invitation to be present at an examination of the merits of their respective lenses, and we propose now to detail the nature of the examination, and the conclusion at which we have arrived.

Two newspapers of the same day and date were pasted on a flat screen, each presenting the same side towards the object glasses of the respective cameras, which were placed side by side in the same plane, and at equal distances (about 2¼ feet) from the screen. The lenses were double combination, whole plate, portrait lenses, nominally of the same size (3 inches aperture), but with a slight difference in favour of Professor Petzval.

As the examination was conducted in the absence of Professor Petzval, though not in that of M. Voigtlander, who was present to give any explanations we might happen to require, we may mention that when we commenced our observations, we were wholly unaware which of the lenses was that of the former gentleman and which that of the latter; they were simply distinguished, the one from the other, by being lettered A and B. We may also mention, too, that, not wishing to rely entirely on our own judgment, we were accompanied by a gentleman whom we knew to be entirely free from prejudice in favour of or adverse to either party, and who knew nothing of the questions in dispute between them.

The first test showed that as regarded flatness of field and sharpness of outline, the advantage was decidedly in favour of that marked letter B; and it was only after we had expressed this opinion that we were informed of the fact that this lens was made by Voigtlander; and this also, as we have mentioned above, had the disadvantage of having an effective aperture, the diameter of which was one-tenth larger than that of the Petzval lens.*

At our suggestion the latter lens was then taken out and carefully cleaned, and another examination made, which resulted in our coming to the same conclusion as before.

M. Voigtlander then removed the *back* glass from the Petzval combination and substituted in its stead the corresponding one from his own; the result being a marked improvement in the clearness and definition of the print on the ground glass, but still not making the Petzval combination quite equal to the Voigtlander.

The lenses were now taken apart, and the diverging glasses added to the front lens of each combination, with the view of making them orthoscopic; and here M. Voigtlander called our attention to a circumstance, which though it may at first appear trivial, is, nevertheless, of some importance. This circumstance was, the number of screwings and unscrewings (six) requisite in making the alteration in the Petzval lens, whereas in his own combination only two such operations were required, thus lessening, in a great degree, the risk of the lens being temporarily rendered useless by the wear and tear of the screws, or by one of the different operations having been performed erroneously.

The two lenses being now made orthoscopic, and of about thirty inches focus, were attached in succession to a camera, and focussed with the full aperture so as to give the sharpest possible image of two similar newspaper paragraphs pasted on the screen at a distance from each other of fifteen inches; the distance from the object glass being seven feet four inches.

In this test, the superiority of the Voigtlander over the Petzval lens was even more manifest than in the other; not only could the central paragraph be focussed clearer, and more sharply defined, but this clearness and definition extended in nearly the same degree to the paragraph near the margin of the field of view; whereas with the full aperture of the latter lens the central paragraph *could* not be focussed with accuracy, but presented a thick and blurred appearance—in other words, was deficient in sharpness and precision—and that near the edge of the field of vision was so hazy and indistinct that it was impossible to read it. When the central paragraph was focussed as accurately as possible, the distance which the focussing screen had to be moved towards the lens in order to bring the marginal image sharp, was in the Voigtlander lens a quarter of an inch, and in the Petzval lens upwards of half an inch.

These tests, of course, could not be conducted otherwise than with strict impartiality in our presence; and, as to the lenses employed, we believe they are both the property of M. Claudet, in whose room the examination was conducted, and whose honourable reputation we consider to be a

* The lenses used were No. 235; maker's name, M. Dietzler: and No. 7,512; maker's name, M. Voigtlander.

sufficient guarantee that these lenses were manufactured by the individuals whose names were engraved on the tube.

We wish it to be distinctly understood that no comparison was instituted between any other lenses than those mentioned. There was no question of the relative merits of these lenses and those of any English maker, but a simple examination as to the superiority of the Petzval lens over the Voigtlander lens, or *vice versâ*.

NEW SOLVENTS FOR CELLULOSE, &c.

BY M. LEON KRAFFT.

For some time past there has been considerable talk in the scientific world of the new solvents of cotton and silk discovered by Dr. Schweitzer, of Zurich. This discovery, as important as unexpected, has already enabled some of our learned academicians to elucidate several hitherto very obscure points in vegetable physiology. M. Barreswil, whose name is so honourably known among photographers, in giving an account of the labours of Dr. Schweitzer, in his *Répertoire de Chimie*, expressed a hope that photography would derive some advantage from these new solvents. It was our opinion, at that time, that such would be the case, and our opinion has been strengthened day by day since then, as the properties of the new substances were more closely examined.

According to Dr. Schweitzer, certain compounds of copper and ammonia possess the property of dissolving cellulose, silk, and other organic substances, almost *instantaneously*. The compound in which he first discovered this property, and which he designated *oxide of cuprammonium*, is obtained by treating the basic hyposulphate of copper with ammonia in excess; an easily crystallisable double hyposulphate of copper and ammonia is the result. The mother-liquor which contains oxide of cuprammonium, is the new solvent of the cellulose. Its preparation occupying some time, M. Schweitzer has replaced it by a green subsulphate of copper in an excess of ammonia.

Recently, also, M. Peligot has still further simplified this process, and at the same time rendered it more economical He fills a glass adapter with copper turnings, and pours on it gradually a certain quantity of solution of ammonia. The liberation of caloric ensues, and a blue liquor is produced.

If cotton be plunged in this solution, it will be seen to change into a thick jelly, which disappears on the addition of a certain quantity of water. To obtain this liquid perfectly limpid, it must be filtered through asbestos, for it perforates a paper filter immediately, which is the same thing as saying that the new re-agent dissolves it. The cellulose can be precipitated by means of alcohol, acids in excess, concentrated solutions of alkaline salts, honey, gum, dextrine, &c. &c. It may even be obtained in amorphous membranous sheets by simple evaporation of the solvent, and these sheets do not adhere to the surfaces on which they are formed.

That which we have said of cotton applies equally to silk, for which Dr. Schweitzer has besides found a special solvent in the ammoniacal oxide of nickel. This re-agent, which exerts no action whatever on cellulose or cotton, does not abandon the silk when mingled with concentrated saline solutions, sugar or gum.

Gun-cotton is insoluble in the two solvents of which we have been speaking.

M. Frémy has shown that ligneous fibres and the pith of trees are completely insoluble in the ammonia-copper solution, and that this insolubility does not arise from the great cohesion of the molecules of the wood, since he has been able to dissolve by its means the substance known in commerce as vegetable ivory, which is so extremely hard that steel cuts it with difficulty. According to M. Payen, the textile fibres of hemp and flax are also soluble in the same re-agent.

Finally, M. Pelouze has contributed his part to these researches. He has ascertained that highly concentrated hydrochloric acid is an excellent solvent for cellulose, and that it dissolves it in a few seconds with great facility. Water forms in this solution a precipitate of striking whiteness, identical with that given by the acids in the ammonia-copper solution of cellulose. He has observed besides that if, instead of immediately adding the water to the acid liquor, a delay of one or two days be allowed to take place, the precipitate will not then be obtained, and that the ligneous matter will have completely disappeared, from having been transformed into glucose.

Hence, then, photography is in possession of several solvents of lignine; consequently of the means of possessing several kinds of collodion, which will, at all events, have the advantage of rendering the use of the costly substances—alcohol and ether—unnecessary. The question to be considered is—How ought they to be prepared?

We will hazard a suggestion of what may be done in this way, which it appears to us might be attempted with success; for example, spread on a glass plate a film of solution of cotton in oxide of cuprammonium, and allow the whole or a greater part of the ammonia to evaporate, then plunge the plate in water slightly acidified with any kind of acid, then wash it in water, and afterwards pour on an aqueous or alcoholic solution of iodide or iodide of potassium; after this has remained on it a few seconds, immerse the plate in the ordinary silver bath, wash, and expose in the camera as usual.

If these operations appear too long, take the solution of cotton in concentrated hydrochloric acid, cover a plate, and let the acid, which is extremely volatile, evaporate, and afterwards plunge it in a nitrate of silver bath, previously rinsing it in water. We shall thus have a film of chloride of silver, a substance we all know to be very sensitive to light, since it is constantly employed in the production of positives.

The last method is exceedingly simple, but it almost involves the necessity of preparing the collodion day by day, inasmuch as hydrochloric acid very speedily transforms the cotton into sugar.

We could easily find other methods of preparing collodion by means of the new solvents we have described; but we do not wish to do more than point out some of the results of recent chemical discoveries which are applicable to photography; it only remains for adepts in that art to render practical and perfect the methods, the novelty and possible advantages of which we have summarily pointed out.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

The normal collodion being obtained, it becomes now a question of rendering it photogenic; and, to accomplish this, it is only necessary to adopt one of the numerous formulæ published; there is no lack of choice. It is not necessary to attach an exclusive importance to either of them. We will merely observe, that with a collodion simply iodised with the iodide of potassium, one may attain perfection with certainty.

In a bottle containing alcohol, say half an ounce for example, dissolve to saturation a mixture in equal parts of iodide of potassium and iodide of cadmium, perfectly dry and finely pulverised. The dissolution will be complete at the end of a few hours; the proof that it is as concentrated as possible will be found in the presence of an excess of undissolved iodide at the bottom of the bottle. This mixture of alcohol and iodides may be made at the same time as the normal collodion, and they will be ready together. Decant the normal collodion and add to it a certain number of drops of iodised alcohol, we will assume not sufficient for the purpose, but this has to be ascertained in the following manner:—Take a glass plate and clean it thoroughly and pour on the collodion; when set immerse it in the bath for one or two minutes; then withdraw it and examine the tint. Seen directly, the film ought to have an *opal bluish*

* Continued from vol. ii. p. 29.

tint; if it be simply *bluish*, the film is not sufficiently odised; if it be *dead white*, it is too much so. In the case supposed it is of a bluish tint, and fresh additions of iodide must be made, in very small quantities, until the collodion has acquired the requisite degree of perfection; when it may be at once used for taking a proof. This proof will not be of any value, inasmuch as it will be covered with black and white specks; but by means of it one may be able to arrive at a correct appreciation of its qualities and the degree of iodisation, which the inspection of the blacks furnishes. This is the real criterion of all collodion. The newly made collodion having been assayed and its qualities tested, nothing more is required than to leave it to finish the different reactions which are necessary to give it its full value, for a time at least, for these reactions, which are at first favourable, eventually deteriorate it.

We have observed that a new collodion gives at first a film covered with black and white specks. These spots are evidently caused by the insoluble particles held in suspension. Filtering would remove the greater portion of these, but this mechanical method of purifying would be too coarse, and we may even say completely illusory, and should never be adopted. These insoluble particles ought to be left to deposit themselves spontaneously; and to accomplish this time is required, and the colour, which is gradually modified, indicates not only the degree of purification of the collodion, but also the progress of the favourable reactions, of which we were just now speaking. Thus the mixture, at first troubled and whiteish, clears by degrees, and becomes slightly yellow; this tint deepens more and more, and at the end of twenty-four hours, or even less, it exactly resembles the colour of olive oil. But that is not sufficient; not only ought the collodion to have acquired this decided tint, but also to be perfectly transparent. For some preparations four days will suffice; for others eight days will not be too many. But when this point is once reached, there is every reason to believe that, the chemical reactions of the mixture being terminated, the collodion may from that time be used with safety.

Besides the deposit due to the fragments of undissolved cotton-powder, and to the impurities which may accidentally exist in the iodides, another may present itself of a mealy and whiteish appearance. This deposit, which ought not to be eliminated, is merely iodide of potassium, precipitated from the alcoholic solution by the ether. After decantation this should be re-dissolved by means of a small quantity of alcohol, and added to the mixture. This deposit only occurs when ether rectified to too high a degree has been used. With such an ether it is quite a chance whether a good preparation is obtained or not. In fact, the rectified ether contracts, on contact with the alcohol, so great an affinity for it that it forces it to abandon a portion of the iodide it held in solution. From which we conclude that the iodides are not at their ease except in a less highly rectified ether; we even doubt whether the resumption of the deposit of iodide by a new quantity of alcohol, may not be an imperfect correction.

(To be continued.)

HINTS ON THE COLLODION PROCESS.

BY H. BELLINI.

Having promised to send a receipt for a developing solution which will not fog, or by using which "over development" is avoided, I beg leave to submit the following formulæ to your notice. I have found it useful (for ivory, mica, and talc portraits, for pins, lockets, &c., &c.) when the light was going, or gone, and it was useless for, or a person objected to sit again. In these cases I found a quick and sharp developer, giving good blacks and whites, also most important. Of course there may be others superior for other purposes, or when the certainty of the action of this preparation is not so material.

Background best.—A grey or slate colour.

Light best.—A direct north, if possible; if not, any other found good from experience.

Head light.—If a too powerful bright light strikes on the head, hands, and bust of the sitter, use a light slate-coloured glazed calico head shade; this gives a sort of solidity or relief to the head, &c.

Grouping.—I prefer three-quarter-face, but much depends upon the features of the sitter, light, circumstances, and the artistic taste of the operator.

Collodion best for this purpose is, to my fancy, the American excelsior positive collodion. Try the effect of 30 drops of sulphuric ether and 4 or 5 drops of very concentrated alcohol added to 1 ounce of the above collodion.

Bath best.—60 grains of the best and purest nitrate of silver (in crystals) to every ounce of distilled water. Add ¼ ounce of collodion prepared as above, and 2 drops of nitric acid to every 5 ounces of bath (add the collodion while the bath passes through the filter paper into the gutta percha receptacle). If the bath is too strong, gradually add ½ ounce of distilled water (trying a plate between each addition) till you get a thick and cream-like film; perhaps you will succeed without adding more water; in summer keep the bath surrounded with cold water, and then this bath will not be too strong; and, besides, you will produce fine pictures. Keep this bath covered from dust and light, whether a plate is on the dipper or not; and you must also count at least 100 tolerably quick after the usual oiliness has disappeared from the plate before it will produce its finest effect.

Use a diaphragm placed close to the front of the lens; thus you obtain an increased amount of sharpness, but slowness of the lens (according to the size of the diaphragm used). I cut mine from thin black gutta percha, or black cardboard, and use also a black gutta percha cap for the lens.

Without extreme cleanliness the best chemicals and instruments are useless; and, therefore, clean the plates well with the following solution, viz.:—

Tripoli	1 ounce.
Water	1 "
Nitric acid	50 drops.

Polish with a very soft leather; after, of course, using a sufficient number of pieces of lint to remove the above mixture. Finally, test the cleanliness of the surface of the plate by breathing upon it; if the breath upon the glass dies rapidly and evenly away, the glass is fit for use. Flatted crown is the best (of the cheap kind) to use.

Nearly all common glass has a slightly concave and convex, as well as a rough and smooth side; the smooth and true side is easily ascertained, by placing it close up to the ear and scratching it with the finger nail.

Focus for the eyes, eyelashes, and shades of the face; thus you obtain the proper expression of a person's features, instead of the caricatures usually exhibited. As the chemical and visual foci do not coincide in certain lenses, the diaphragm partially rectifies this great fault.

Developing solution:—

Water	3 ounces.
Nitrate of potash	12 grains.
Protosulphate of iron	2 drachms.
Nitric acid	30 drops.
Glacial acetic acid	½ drachm.

The following added to the above, just before using, is an improvement, viz.:—

Pure alcohol	30 drops.
Nitrate of silver bath (prepared as aforesaid)	15 "

Filter carefully from the bottle it is mixed in into another, then place a second clean piece of filter paper in a measuring glass, and again filter and use as required.

The fixing solution is composed of the smallest possible quantity of white (not yellowish) cyanide of potassium in distilled water; common water and strong fixing, or too much nitrate of potash in a developer, gives as a result a white, flowery, and rough surface; the weak, therefore, is the best. I make my own after this rule in all cases, and

neither myself nor pupils have ever found pictures to fade, or the film to have, after a time, a sort of moth-eaten appearance; it ought only to take the white film off after counting fifteen slowly. Pour gently from the spout of a quart jug clean common soft water, at a height of at least 14 inches from the plate, over the film after development and fixing; don't spare the water, nor allow the cyanide to remain on the plate a single second after the half-lights have made their appearance, and particularly wash from the height (14 inches) before directed, commencing gently from the middle of the plate, thus pressing it down, and preventing the film from being washed off. By this means you obtain all the clearness, delicacy, and steely appearance of the daguerreotype process, combined with the certainty of settling the great question of permanency.

Filter the bath, developer, and fixing solution every night after work, or before commencing in the morning, with separate and clean filter papers, the old bath filter paper excepted, which you may use until it is worn out, provided you keep it free from foreign substances, such as iron, cyanide, &c., otherwise you would weaken the bath too much in consequence of the paper absorbing the silver.

The following is a safe, correct, and simple plan to test a good lens, particularly where a person has only a limited knowledge of the laws of optics:—Paste two dozen long black or grey hairs on a strip of cardboard 1 inch apart, comb fashion, and then fix with a couple of pins to a black, grey, or slate background; then take a picture of them on a 5 × 4 plate (commencing from the middle of the plate upwards), noting the degree of distinct sharpness and time of exposure; and, again, another from the middle, downwards, repeating the noting, &c. A lens that will accomplish this distinctly (from the top to the bottom of the plate), and with the same time of exposure, is a good one.

Cautions.—Do not hang white clothes, or keep white paper, or bright tin vessels in the dark room; also beware of the vapours of ammonia, or striking lucifers in the dark room. Pin-holes admit an astonishing amount of light, and are, therefore, deadly enemies to the production of first-class pictures. I have seen so-called dark rooms which admitted more daylight than many glass houses could boast of. One in particular belonged to a pupil of the celebrated Mr. A——, in which was a large room window, a partition with a door to it having been put up at the end of what was once an old lumber room, but possessing capital side and head lights; this room window he had merely covered over with a single thin piece of pale yellow tissue paper, and the walls were white-washed; in fact, he almost developed by daylight, so you may guess he did not produce very good pictures. Well, he fancied his camera admitted light, that the glasses had been displaced, his collodion or the developer bad, and, finally, that some friend (?) had good-naturedly "queered" his bath. These I tested at my own place, and found that I could produce better pictures than he had done with his own tools. I then took my favourite chemicals and instrument, but succeeded no better than he had done. Now I knew that the fault lay in the dark room: I advised him to have a pane of yellow glass inserted in the middle of the bottom of the window, and the rest covered over with black paper, the walls also covered with ditto, and the holes stopped up; this done, we both met with success.

PRESERVATION OF SENSITIVE PAPERS, AND NEW PROCESS OF NEGATIVE PHOTOGRAPHY.

BY M. GAUMÉ.

THE last number of the *Bulletin* has induced me to think that many of the members of the Society would, perhaps, feel an interest in knowing the method I employ for preserving my nitrated papers during several weeks without alteration; and, consequently, as available for use as if they had been prepared the previous evening. However, I cannot say if they would remain thus for an indefinite period, not having tried them for a greater length of time than three weeks.

After having nitrated the paper, allowed it to drain, and dried it thoroughly at the fire, I enclose it in a box lined in the interior with plates of plaster of Paris, loosely tempered, and thoroughly dried either in an oven, or on a stove. These plates which may be easily removed, dried from time to time, so as to deprive them of the humidity which they absorb in the atmosphere; the prepared sheets of paper placed in this box ought not to be pressed one against the other, but rather placed edgeways in such a manner that the air between them should remain dry; these plaster plates being very hygrometric, and of a certain thickness, the internal air of the box, which should be well-closed, remains perfectly dry; and, according to MM. Davanne and Girard, the papers ought to be preserved in this state for an indefinite period.

In sending to the Society my positive paper process, *à la gutta*, I announced that I had a negative process which it appeared to me ought to be preferable to those employed hitherto. The essays which I, as well as my friend M. Boivin, who is known to you by his dry collodion process, have made, convinced me that I was not deceived. For after three weeks' preparation with the aceto-nitrate, these sheets gave proofs as good as those of the first day, and were as sensitive as the glass plates by my process on glass.

The sheets are prepared precisely like my positive paper, only, instead of chloride of sodium, I put from 2 to 3 per cent. of iodide of ammonium, and one of bromide in the albumen, and dry it at the fire. I expose in the camera on ground glass, and develop with gallic acid strengthened with some drops of aceto-nitrate.

I fix with hyposulphite at 50 per cent., and wash as with positive proofs.

To sensitise I entirely immerse the sheet in the ordinary aceto-nitrate, then wash it three or four times in rain water, and dry it at the fire. After this operation, if I fear resinification of the gutta, I plunge the proof, for a few seconds, in benzol, which removes the greater part of the gutta, and I wax the proof, as heretofore, if it is very strong, or leave it semi-transparent if it is weak, and I desire to have a vigorous proof.—*Bulletin de la Société Française de Photographie.*

STEREOGRAMS FROM FLAT SURFACES.

IN the latter part of last year, an ingenious device for the purpose of obtaining pictures from flat surfaces, suited for stereoscopic purposes, was made known to the world by Mr. Sang. At the first appearance of the thing some of our contemporaries were very much carried away with the idea, and committed gross blunders in the appreciation and estimation of the discovery; while others, who had hit upon the method of producing these results, were unusually severe in their exposure, we might almost say condemnation, of it. That the invention is clever, there can be no denying; and when we first noticed it we remarked that—"we must give to Mr. Sang full credit for the great ingenuity he has shown in thus bringing (however imperfectly) the world of the painter and engraver into the domain of the stereoscope." Since the announcement of Mr. Sang's device, we were not aware that any one has attempted to produce stereograms from flat surfaces. We have, however, lately been favoured with a specimen by Mr. George A. Dean, of Douglas, Isle of Man. The subject which he has chosen for illustration is a most difficult one, and he certainly has succeeded in giving the stereoscopic effect very well. It is one of the cartoons from our facetious contemporary *Punch*, entitled "The French Porcupine," wherein is represented his imperial majesty the Emperor of the French as a porcupine, his bristles consisting of bayonets—the motto under which is—"He may be an inoffensive animal, but he don't look like it." Now our readers will be enabled to form some idea of the difficulties with which Mr. Dean has had to contend, in retaining the sharpness of the bristles—or bayonets. The specimen is very good, although not quite so successful as those which Mr. Sang has produced.

Lessons on Colouring Photographs.

COLOURING IN OIL—(*continued*).

Second Painting—(*continued*).—The distant scenery in the landscape background may be painted with the same tints, a little modified, as the sky. The sky line, or point where the landscape and sky meet at the horizon, must be sufficiently well marked, without being hard. The sky tints, modified with deeper greys, will serve for the distance, the forms as well as colours being vaguely defined—for clearness, and sharpness of form and definition, as well as brightness of colour, are lost in the distance. It is no part of our object in these lessons to give instruction in drawing; and, unless the colourist has some knowledge of drawing, it will be very unwise to attempt to paint a landscape background: all we need say on this part of the subject is, to repeat what we have already observed—that all objects in a background should be subservient to the principal figure, and should be quiet and unobtrusive in colour and form. In painting the middle distance and foreground of the landscape, therefore, whilst using brighter tints and sharper definition, the idea of atmosphere and distance must still be preserved, even in the most advancing parts.

The draperies in a good photograph have already the form of fold, and the texture of material so admirably rendered by light and shadow, that it is rarely necessary to make any alteration in these respects—colour is all we have to add. The following tints, for various colours of silks and satins, will be found useful; they must be modified in some cases to suit the tone of the photograph:—

For white silk or satin:—The lights, white; middle tints, white, black, and sometimes a little Indian red; reflects, white, French blue, and brown ochre; shadows, black, white, and Indian red.

Blue silk or satin will require either white and French blue, or white and Prussian blue, for the lights, depending on the tint required; middle tint, the same, with more blue; reflects, brown ochre added to the above; shadows, ivory black, Prussian blue, a little white, and sometimes a little vermilion.

Red silk or satin will require the following tints, modified as the red may approximate to scarlet or crimson:—For lights, yellow ochre, light red, and white; middle tint, Indian red, crimson lake, and vermilion; reflects, vermilion and light red or carmine, and yellow; shadows, Indian red, lake, vermilion, and a little ivory black.

Yellow silk or satin:—King's yellow and white for the lights; middle tint, yellow ochre, brown ochre, white, and a little black; reflects, yellow ochre and light red; shadows, brown pink and burnt umber.

Green silk or satin:—Lights, Prussian blue, King's yellow, and brown pink, or emerald green and white; middle tint, Prussian blue, brown pink, and King's yellow; reflects, Prussian blue and brown pink, and sometimes a little lake; shadows, the same, with more Prussian blue.

Black silk or satin:—Lights, light red and a little white; middle tint, lake, white, and ivory black; reflects, lake and black, and sometimes a little brown ochre or brown pink; shadows, lake and ivory black.

Cloth fabrics will often require the same tints, differently combined, and painted with less brilliancy. Black cloth will first have the shadows strengthened by glazing with lake, Vandyke brown, and black, and the lights then painted with a mixture of black and white.

White linen will require the same tints as white satin, but less brilliant; sometimes the whites of the photograph, with very slight modifications, may be left as they are.

Gold ornaments may be painted with yellow ochre, or yellow ochre and raw umber; the shadows, burnt sienna and raw umber; and lights, Naples yellow.

In the second painting, the work should be sufficiently brought forward to have a tolerably finished effect. In portions of the picture requiring softness and blending of tints, the badger-hair softener may be used cautiously. This will also reduce the surface to a level, and remove the marks of the brush where the handling is too bold or abrupt; but care must be used not to produce a woolly effect.

In this painting, the colours must be kept pure and brilliant, as it is easy to soften them afterwards; and some allowance must be made also for the subduing and toning effect of time.

The second painting concluded, again carefully put the picture in a place free from dust to dry.

(*To be continued.*)

Dictionary of Photography.

CARBONATE OF AMMONIA, of commerce, or *sal volatile*, is, strictly speaking, the sesquicarbonate, containing two equivalents of ammonia and three of carbonic acid. It is usually met with in the form of a transparent fibrous mass, which is soluble in about three parts of cold water. Exposed to the air at the ordinary temperature, it loses its ammoniacal odour, and crumbles down to a soft white powder, which is a bicarbonate, consisting of one part of ammonia and two parts carbonic acid. The same salt is produced when a warm saturated solution of the commercial sesquicarbonate is allowed to crystallise; neutral carbonate of ammonia remains in solution, and regular crystals are deposited, which are inodorous, and quite permanent in the air.

CARBONATE OF BARYTA. In the native state this forms the mineral *witherite;* it may be artificially prepared by adding carbonate of ammonia or of soda to a solution of chloride of barium. It forms a heavy white powder insoluble, or nearly so, in water. It is very useful in separating sulphuric acid from a solution, which it does readily if mixed up with it, on account of the great affinity existing between these two bodies, and the total insolubility of sulphate of baryta. The reaction consists in the substitution of sulphuric acid for carbonic acid, as shown in the following equation:— $BaO.\ CO_2 + SO_3 = BaO.\ SO_3 + CO_2$. The carbonic acid being evolved with effervescence, nothing remains but the sulphate and excess of carbonate of baryta, which can be removed by filtration.

CARBONATE OF LEAD. *White lead* of commerce is a soft white powder, of great specific gravity, insoluble in water, but soluble in dilute nitric or acetic acids. It is prepared to an immense extent for the use of painters, by the reaction of carbonic acid produced by fermentation upon metallic lead in the presence of a small quantity of vinegar.

White lead is a valuable paint, on account of what is technically called the great *body* which it possesses; it is, however, liable to the serious drawback of turning black if exposed to the air, owing to its ready absorption of the sulphuretted vapours which are always floating about in the atmosphere, especially near large towns, black sulphide of lead being produced. For this reason preference should always be given to a recently introduced substitute—*zinc white*, which consists of oxide of zinc. Many beautifully coloured portraits have been from time to time brought under our notice, which have been entirely destroyed from this cause. Carbonate of lead is also used for glazing visiting and other cards, and, in this form, has been made subservient to the requirements of the photographer, by acting as a support for collodion pictures.

CARBONATE OF LIME is a body largely met with in nature as chalk, limestone, marble, Iceland spar, &c. It may be artificially formed in the same way as carbonate of baryta, by adding a soluble carbonate to a soluble lime salt; it forms a soft, white powder, which has been used by Maxwell Lyte for removing sulphuric acid from its solution in the preparation of metagelatine. Sulphate of lime being, however, slightly soluble in water, carbonate of baryta should be employed by preference. Carbonate of lime is

also of frequent use in neutralising acids in solutions where the presence of a soluble lime salt is immaterial.

CARBONATE OF MAGNESIA. *Magnesia alba* is the compound which is known in commerce under this name, although, chemically speaking, it is a mixture of neutral carbonate of magnesia with magnesia and water. It is prepared by precipitating a solution of sulphate of magnesia with a soluble carbonate; boiling for a few minutes, and then filtering and washing the precipitate. In photography the carbonate of magnesia is sometimes used to prepare nitrate of magnesia, one of the first substances employed for preserving the sensitiveness of collodion plates.

(To be continued.)

A Catechism of Photography.

THE TONING BATH (*continued*).

Q. What other formulæ beside those already named are used in the toning of photographs?

A. In place of the simple chloride of gold the following solution is sometimes employed:—

Water	1000 parts.
Chloride of gold	1 "
Hydrochloric acid	10 "

This solution is exceedingly rapid in action, and is particularly useful in restoring proofs which have turned almost black.

Q. What other methods are employed?

A. M. de Caranza proposes the chloride of platinum as a substitute for the chloride of gold. The effects produced by this process are very good.

Q. How is the process conducted?

A. As soon as the proof has been sufficiently developed, the high lights assuming a violet tint, the impression is taken from the frame and plunged into a basin containing the following solution:—

Distilled water	2000 parts.
Chloride of platinum (as a syrup) ...	1 "
Hydrochloric acid	30 "

After an immersion of a few seconds the proof changes its tone to a bluish grey, the high lights and deep shadows being beautifully developed in black and white, while the half-tones are well preserved. As soon as this is accomplished the proof should be removed from the platina bath and well washed in five or six waters; it is subsequently transferred to a solution of milk of lime, and, finally, plunged into a bath of hyposulphite of soda, which has the effect of giving depth to the blacks, a rose tint to the half-lights, and preserving the brilliancy of the bright lights. A quarter of an hour is amply sufficient to fix a proof by this process; and it is found to be very successful.

Q. Describe some other process.

A. Photographic positives are sometimes fixed and toned by employing the sel d'or, besides which there is another process which has the effect of giving the proof a brown-red tone, almost approaching that of carmine. The proofs, in this instance, are immersed in a bath of water, to which is added a few drops of the saturated solution of bichloride of mercury.

Q. Does not the process adopted by M. de Molard and some other French photographers differ from any of the formulæ to which allusion has already been made?

A. It does. The process of M. de Molard is exceedingly rapid in action, and is very successful. The proofs are fixed by a solution of ammonia, in the proportion of one part to five parts of water; after being thoroughly washed, the proof is placed in a bath of pure water, to which is added a few drops of the solution of the *cyanure iodeux*.

Q. What is the *cyanure iodeux?*

A. This liquid is so called by M. de Molard, and is a mixture of the iodide of potassium and the iodide of cyanogen. In 10 grammes of distilled water is dissolved one gramme of cyanide of potassium; to this is added iodine, and the solution is shaken until it assumes a violet tint. The action on the proof is very rapid; while in the ammoniacal bath it is red, but quickly changes its tone to brown, bistre, black, blue-grey, and would be completely effaced if the action was not stopped. It must be removed from the bath the moment the required tone is obtained, and briskly washed in pure water.

Q. Are any other methods used in toning positive proofs?

A. Yes, numerous other methods are employed, and all are more or less varied according to the taste of the operator, the toning bath being chiefly remarkable for the artistic effect which it imparts to the proofs, and according to the colour or intensity required is the bath regulated.

WASHING.

Q. Why is so much stress laid on washing in detailing the various processes used in toning positive photographs.

A. Because so much depends on the perfect washing of the photograph both after fixing and toning; and a failure in this particular destroys results otherwise the most perfect.

Q. Is it necessary to wash the proof after immersion in the hyposulphite bath?

A. Yes, this is most essential; for if hyposulphite of soda, even in the smallest quantity, be allowed to remain, it causes the picture to fade. After the process of toning it is necessary also to wash the proof thoroughly; otherwise certain chemical agents are allowed to remain on the proof, decomposition takes place, and the whole labour of the operator is defeated.

Q. Is not hot water sometimes used for washing positive proofs?

A. It is; the chief advantage being that the action is more rapid than when cold water is employed.

Q. Is not running water recommended?

A. Yes, and it is desirable to use it when practicable. In either case the greatest care must be taken that all the proofs are thoroughly saturated with water; that the stream be continued till it runs off from the proof perfectly clear; and that when immersion is used, the proofs be removed, and fresh water renewed until no fresh solution takes place, and the water in which the proofs are laid remains unchanged.

Correspondence.

THE WET *versus* THE DRY PROCESS.

To the Editor of "THE PHOTOGRAPHIC NEWS."

MR. EDITOR,—The communication in vol. ii. p. 9 of the "NEWS" from Mr. A. Mactear, of Glasgow, was one which, I have no doubt, would be read with interest by a great many of your readers. I have often regretted that notes of photographic tours were not more frequently published in the journals, for, judging by the few that have occasionally made their appearance, what a fund of amusement and instruction would thus be elicited, when we consider that every summer hundreds, and perhaps thousands, of enthusiastic amateurs are ransacking every nook and corner of our pleasant island for the beautiful and the grand! By such a correspondence, not only would the relative merits of the wet and dry processes be discussed, and the sources of failure sometimes attending the latter be made known, but the most interesting spots, as well as what architectural subjects are "photographically possible" could be pointed out, thus, in some measure, supplying the desideratum mentioned in vol. ii., p. 11, by "W. W." With a view to assist in establishing such a correspondence, and also to reply to Mr. Mactear's conclusion respecting the dry process of Mr. Fothergill, I send you a few particulars of a week's ramble with the camera among the English lakes.

I had for some time practised the collodio-albumen process, occasionally getting a good negative, that is free from blisters, but those horrid "sores" began so fearfully to increase, spoiling almost every plate, that I abandoned it with little regret as soon as Mr. Fothergill showed us a "more excellent way." My second plate with the new process, like Mr. Mactear's, was so beautiful, that I at once determined to prepare a quantity and start on my destined journey. But here I differed from Mr. M. in the preliminary preparations. Instead of a deal, I had a well-seasoned mahogany box constructed, the grooves and inside of which were twice coated with shell-lac varnish; hence the difference of results, as the sequel will show. I should scarcely have thought, Mr. Editor, that a "practical" photographer would have put *prepared* plates in a common deal box; much less should I have expected him to abandon a good process, simply because such a piece of carelessness had once spoiled his pictures. Having got ready about 4 dozen 10 × 8 plates, and sufficient developer for 3 or 4 to ascertain the proper exposure, and having been bitterly disappointed that a friend who had contemplated going with me could *not* go, I started alone with my precious charge at 10 o'clock p.m., the 21st of last June. The rain began to pour down in torrents as soon as I entered the railway carriage, which was anything but a pleasing omen for one in my situation. However, before reaching Leeds (which I did at 3 o'clock in the morning), it had cleared away, and the unclouded rising of the sun gave promise of a fine day, and dispelled my gloomy fears. As I had to stay in Leeds until 6 o'clock, and, not liking the appearance of the cold waiting room, I wandered forth into the town to wile away the time. There are few objects in that smoky place to interest the traveller; but the new Town Hall is a fine building, and I soon found myself selecting the best spot for a view of it. Having satisfied myself that one might be obtained, I contemplated taking one on my return. But it soon occurred to me that the atmosphere would not admit of it when the factory fires were lighted, so I went back to the station, got the porter to carry up my camera, and fired away plate No. 1. The clock struck five as I replaced the cap which brought home the fact that it was rather an early hour to be taking photographs. As we went whirling past Kirkstall Abbey I (photographer-like) was painfully sensible of the inconvenience of railways, not allowing one, even with a camera, to loiter on the road. Arrived at Lancaster, 9.30, my resting place for the day. I saw nothing particularly striking in that venerable place, but a splendid view was obtained from the churchyard joining the castle. The day being very clear and bright, I exposed two plates of a distant view overlooking the valley of the Lune. Here, too, I obtained the first glimpse of the blue mountains which formed the scene of my destination. I arrived at Windermere station at 8 p.m., and never shall I forget my first view of "wooded Winandermere, the river lake," calm as a mirror below me, surrounded by its "fells" and mountains, then steeped in the gold and purple hues of sunset. As I was riding down to Bowness, I fell in with a professional photographer of that place, who kindly, at my request, granted me the use of his dark room to develop my exposed plates. My anxiety to see whether my journey was likely to prove a failure was great; so having ordered supper and a bed, I proceeded to Mr. F——'s, and judge of my satisfaction and delight as I returned to my lodgings with two perfect and beautiful negatives of the scene that had just charmed me at Lancaster. Three things contributed to make me sleep soundly that night, viz., not having slept any the night before, the prospect of fine weather, and the probability that my plates would turn out successful. I arose in high spirits the next morning, and having engaged a man and boat, proceeded to canvass the shores of Windermere. The views from Ray-rigg Bank were splendid, as nearly the whole length of the lake, studded with its numerous islands, can be seen from that eminence. I exposed several plates here, then rowed to "Lowwood Inn," crossed over to Wray Castle, on the opposite shore, and, in returning, landed on Belle Isle, from which a beautiful view of Bowness is obtained. My transferring box (one of Ottewill's) held twelve plates, which were now exhausted; so I returned to my lodgings, well tired with my day's work. I could not, however, resist the temptation of developing another plate or two, which, as the result proved, I had much better let alone. On bringing the negative out to the light, I was mortified to find that, while it had developed beautifully, it was utterly spoiled by a multitude of minute pin-holes covering every part of the plate. For some time I was at a loss to account for such a strange appearance, but at length found out my enemy. On examining the small quantity of silver solution I had brought with me, I found it full of small floating particles, which at once solved the mystery. It had been mixed some time, and I had not examined it before leaving home; thus showing the necessity of attending to the smallest particulars in conducting the different operations. My next day's ramble was to Ambleside, Rydal, and Grasmere. At the former place, Stock Ghyll Force is usually considered the chief object of attraction; but I was so much disappointed in it, that I did not think it worth a plate. Everything at Rydal, of course, is sacred, being honoured as the residence, and immortalised by the sonnets, of Wordsworth. The lake, and the upper and lower falls, Rydal Park, afford pleasing pictures. There is an admirable view from the grassy mound in front of the poet's house, but too distant to be photographed with effect. A few minutes' walk after quitting Rydal brought us to the beautiful and quiet vale of Grasmere. In the centre stands a little church, the resting-place of Wordsworth. Of this sweet spot, well might Mrs. Hemans sing—

> "O vale and lake, within your mountain urn,
> Smiling so tranquilly, and set so deep!
> Oft doth your dreamy loveliness return,
> Colouring the tender shadows of my sleep
> With light elysian;——"

Many interesting views of this "vale and lake" may be obtained from the eminences round, but perhaps, when the day is clear, the best is that from Red Bank; the haziness of the atmosphere, however, prevented me from taking it. Crossing Red Bank and returning to Ambleside by the Clappersgate-road, I planted the camera to take a view of the former place, with Wansfel in the background. While doing so, a number of lads, returning from school, planted themselves right in front of the lens, their object being announced in the words—"Mester, will you draw my likeness?" I proceeded as if to comply, placing them just *outside* the field of view, and giving strict injunctions that unless they remained perfectly still until I told them to move, their "likenesses" could not be "drawn." This plan of dealing with such intruders, I am inclined to think, is superior to the "silver sixpence" one of your Glasgow correspondent. Six o'clock next morning found me seated outside the coach bound for Keswick. Hundreds of splendid views we passed on the road, and more than once did I feel inclined to abandon my seat, and linger behind to record on the sensitive tablet some points of the lovely scenery through which we were passing. Especially was this the case as we wound by the long, narrow lake of Thirlmere. So smooth was the water, that the woody eminences surrounding it, bathed in sunshine, were reflected as perfectly as in a mirror. On arriving at Keswick, the morning, which had hitherto been so bright and clear, began to get hazy, shutting out completely the mountains from the background of my pictures. I spent the day in taking a few views round Derwentwater, returning to Bowness at night. Determining next day to be more independent of circumstances, I hired a car, and having secured the services of a native, proceeded over the heights of Troutbeck, and through Kirkstone Pass to Ullswater. As I contemplated ascending "the brow of the mighty Helvellyn," I had only time to photograph a few of the sublime views which that splendid lake presents. If I ever felt tired in my life it was that night, as I tumbled, half-asleep, into bed, having since I rose in the morning ascended a mountain, taken a number of photographs, and ridden thirty miles.

Next morning I bade farewell to that region of beauty, and started on my homeward journey. Never did I feel so reluctant to leave a spot which in so short a time had made an impression on my memory (and as I then hoped on my plates also) never to be erased. On arriving at the station, I found, to my extreme mortification, that my dark box was left behind. This detained me two hours. At Carnforth junction I could not resist the temptation (as I had not quite exhausted my stock of plates) of turning aside to Furness Abbey. The day was very dull and windy, and gave signs of approaching rain; however, my work was done, so I did not now fear it. Shortly after midnight I found myself once more in my own bedroom, never better prepared for the influence of "tired nature's sweet restorer—balmy sleep," a fact you would not dispute were I to tell you what time I arose next day. I had now, shall I call it the pleasantest, at least, the most satisfactory business of the excursion to undertake—viz., the development of my pictures. And here I would ask the advocates of the *wet process* if they have any conception of the feelings of a genuine photographer, returned from a long ramble amidst some of nature's most beauteous scenes, as by his own fireside, and at his leisure, he sits down and sees gradually appearing on the wonderful tablet, as if by magic, a faithful representation of the charming views, now far away, on which his eye had lingered, and finds that the anticipations he had so fondly indulged while on his pleasurable, not troublesome tour, were not doomed to disappointment, but destined to be realised? Such, Mr. Editor, I am happy to say, was my good fortune. As one after another of my plates were developed, I seemed to travel my journey over again—so vividly did I see in the miniature what had so charmed me in the original. Forty-one was the number of plates exposed; of these four or five were spoiled by the wind shaking the camera, two or three (of shaded waterfalls) from insufficient exposure; the rest (with the exception of a scarcely injurious defect in a few, occasioned by putting the plates in the dark box while wet, after their preparation) were perfect negatives. The one of Leeds Town Hall, taken first and developed last (three weeks intervening), was among the best.

Such were the results of my excursion. Now for the conclusions. First of all, let me observe, that while I had every reason to be satisfied with my success, I learned a lesson or two which I shall remember in future,—viz., not to attempt to take too many pictures in a given time, but pay more regard to the selection of the choicest spots, and the most favourable points of view; again, not to throw plates away on a windy day, and, lastly, always to keep the box containing the plates in your own possession while travelling. In conclusion, may I not, sir, reasonably ask, seeing that such results as these may be obtained, and with ordinary care absolutely depended on, by the *dry* process, when you may prepare any number of plates before leaving home, and after a fortnight's or even a month's absence, develop *there* as many successful pictures, when with your lens slung o'er your shoulder, and tripod in hand, the only apparatus required is a light folding camera and the plate box—I say, may I not reasonably ask, what is the use of all the cumbersome, troublesome, intricate bulk of material which the wet operator has to transport from one view to another? Away, then, with "dark tents," "photographic barrows," "developing cameras," "packing cases," "water bottles," "travelling baths," dishes, bottles, chemicals, weights, measures, with all their packing, unpacking, and tying down, the pouring in and pouring out, "cloths," "wash leathers," cleansing mixture, dust, rolling perspiration, suffocating odours, hotel stained tables and carpets, with all the *wasted time*, and other pleasing reminiscences of a wet collodion campaign.

If I have trespassed too far on your valuable space, deal with me as seemeth good to yourself; content to be your humble servant,

Multum in Parvo.

Nottingham.

Photographic Societies.

Blackheath Photographic Society.

At an ordinary meeting of the Society, held on the 21st March, 1859, at Mr. Wheeler's, No. 10, The Grove, Blackheath; the President, J. Glaisher, Esq., F.R.S., in the chair,

The minutes of the last meeting were read and confirmed.

The President announced the perfect success of his conference with the Right Honourable the Lord Mayor, and had the pleasure of communicating his lordship's acquiescence in reference to holding a Photographic *Soirée*, in connection with this Society, at the Mansion House, on the 15th proximo.

It was moved and seconded, that the Committee originally designated be re-appointed, viz., the President, Treasurer, and Secretaries *ex officio*, Messrs. Bennock, Heisch, and Wood.

Messrs. Stuart Knill and H. Williams were appointed Auditors for the ensuing year.

The President then proceeded to read a paper "On the Application of Photography to investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich."

The author commenced by stating, that the subject resolved itself into two divisions, viz., the purposes to which photography was applied, and, secondly, the method of application; and, he observed, that it was necessary to consider, in some little detail, the first part of the question, that the full value of the application of photography should be understood; and he purposed to confine himself, on that occasion, to the subjects of investigation, reserving the consideration of the mode of application for another evening.

The subjects of investigation are those elements in terrestrial magnetism and meteorology which it is considered most important at present to pursue. First, speaking of magnetism, he said, if a bar of iron be suspended by a few fibres of silk by its centre, it will be horizontal, and will settle in any position; but if the bar be made magnetic, it will at once pass to a definite position, and one end will be inclined downwards. This direction of the magnetic force, he said, undergoes every possible change at the different parts of the earth's surface; and, for the purpose of determining and representing the direction, is referred to two planes—the one horizontal, the other vertical.

If a magnet be suspended horizontally by a few fibres of untwisted silk, it will rest in the magnetic meridian; and the angular distance between this position and the true meridian, is called the variation or declination. The other plane of reference is a horizontal line, the angular distance between which and the inclined position of a magnet, when suspended freely, is called the dip.

In the practice of the observatory, the variations of the dip are made by investigations in the horizontal and vertical components. The variations of the three elements, viz., the declination, the horizontal force, and the vertical force, of the dip, are the subjects of photographic application; and, when it is considered, that if the most minute spider should unfortunately gain access to the boxes containing the magnets, and attach one line of his web to the end of the magnet, that all freedom of motion is destroyed, it is evident that it can be but by some imponderable agent alone that such minute and delicate movements can be registered; and this service is satisfactorily performed by the means of photography.

The author then briefly referred to some application of such investigation. He said the mode of operation was as follows:—Taking the declination as an instance when any portion of the globe was sufficiently rich in results, they were laid down in proper positions on a map, and then, with a free hand, and good judgment, isophœnomenal lines were drawn. A map, thus prepared, by —. Evans, Esq., was exhibited, showing the lines of equal declination, as far as is now known, over the world.

A vote of thanks was then unanimously tendered to Mr. Glaisher for his interesting paper, and a hope expressed that he would resume the subject at a subsequent meeting of the Society.

W. Nelson Smith, Esq., was elected a member, and the following gentlemen proposed for future election, viz., Robert Obbard, David Harding, and Andrew Itter, Esqrs.

The meeting then adjourned.

Photographic Notes and Queries.

M. NIÈPCE'S "NEW ACTION OF LIGHT."

Sir,—As my name has been mentioned more than once in your journal, in connection with M. Nièpce's researches "On a New Action of Light," may I beg of you to favour me by giving insertion to the following remarks. This subject excited the greatest interest at the time of its first announcement, and if the various attempts which have been made to repeat the experiment had been successful, we should not, as Englishmen, have been backward in giving all honour to the distinguished foreigner who first noticed so remarkable a phenomenon.

The impression on my own mind, when reading the original paper, was, that the effects described were considered to be due to a property possessed by certain bodies of absorbing or storing up the actinic force, and of re-radiating the same in total darkness. I, therefore, took some pure forms of bleached cellulose—such as Swedish filtering paper, cotton-wool, &c., and exposed them to the light for about six hours, during a portion of which time the sun was shining brightly. They were then removed to a dark room and laid closely in contact with sensitive albumenised paper; but at the expiration of twenty-four hours no darkening had taken place. I should mention that the sensitive paper was purposely made very dry before the experiment began, in order to be secure against any accidental reduction of silver by organic matter, which the presence of a little moisture might have favoured.

In a second experiment, white filtering paper was soaked in a strong aqueous solution of tartaric acid, dried, and exposed to the sun. It was then compressed in a printing frame with sensitive albumenised paper as before, but no effect was visible, even after a week's keeping.

Afterwards, a piece of glass, covered with white paper and carefully insolated, was taken into a dark room and left for about six hours, nearly in contact with a dry collodion plate, the two being separated by a stratum of air of about the thickness of a sheet of mica. On applying to the film a developer of mixed pyrogallic acid and nitrate of silver, it remained clear, and showed no signs of reduction.

The experiment with the sealed tube which, you, sir, have so conclusively shown to be quite possible, even without the aid of light, I did not myself repeat, having become satisfied, from the results above detailed, that the conclusions of M. Nièpce were not altogether legitimate, and that much remained to be done before these remarkable phenomena could be classified, or the conditions upon which they depend for their success exactly described. F. Hardwich.

King's College, March 30th.

IMPROVED PLATE BOX.

Sir,—Permit me to inform "Euphos" that his improved plate box, as described in vol. ii., p. 22, is on precisely the same principle as Archer's, only by no means so cleverly worked out. The carriers, or frames, should be $\frac{1}{16}$ths of an inch thick, and hinged together at one end, so as to open like the leaves of a book. Silver wire should not be used at the corners, but a thin slip of mahogany let in. Eight frames will be only an inch and a half in thickness, and will carry eight plates, which are quite enough for one day's work, and more than enough for most days. Six plates are sufficient to take out if the wet process is employed, and the getting six good negatives will be a capital day's work. On Saturday (19th inst.) I managed to obtain half a dozen negatives, but in doing so I occupied five hours, although I did not move my dark chamber from the spot where I had erected it. I might have got two more had it not been for the smoke from the seaport town I wished to take, and a haze which pervaded the distance, although the day was otherwise very fine. To obtain certain effects of light, one has frequently to wait a long time; but the trouble and difficulty of working with wet collodion out of doors are such as few persons would believe, and the inconveniences and annoyances very great. I intend to give it up for a good dry process, such as the collodio-albumen. With Fothergill's process I have never been able to obtain a moderately good negative.

Let me advise all photographers, who have leisure and opportunity, to take as many negatives as they can in March and April. There are no better months in the year, and the present month has been a remarkably fine one for photographic excursions. I have been all round the coast of Kent, and am now on that of South Devon, where there are somp charming things, if people will only take the trouble to fine them out. I mention this, as in a recent account of a photographic tour in this district, the writer, after spending one day here, passed on with the remark that there was nothing to detain a photographer longer. Now, after being here a fortnight, I think I could well remain another with advantage, and that even a month longer would afford me quite enough work to do. An Amateur.

PORTABLE STAND FOR A DEVELOPING BOX.

Sir,—I was three weeks ago placed in similar circumstances to your correspondent P. F. P., and I have succeeded in overcoming my difficulty to my entire satisfaction. I sent for a very intelligent workman, and we concocted together a developing box stand, for which he charged me twelve shillings, which has answered my purpose admirably, being very steady, strong, and light, and fits into my developing box which is inside; measurement, 1ft. 10½ in. × 1 ft. 4½ in. × 1 ft. 3 in., and contains all my field apparatus for my full plate and stereoscopic cameras.

The stand is made of beech, and is of the most simple construction; the legs have no centre joint in them, but the height is gained in the top block, which is hollowed out so as to make it as light as possible without deteriorating from its strength and firmness. The developing box, when on the stand, is two feet high, which I found a good working height for a man 5 ft. 8 in.; but without increasing the length of the legs, or weight of the stand, it might be made of mahogany in place of beech, and two inches higher in the block. P. R. Innes.

QUERIES ON THE NITRATE BATH.

Sir,—The other day when using a bath which had been put away for some time it produced the following result:—

On dipping the coated plate in the silver solution, the film of iodide of silver formed perfectly and then dissolved. I then added some iodide to the bath, thinking that it might be deficient, but, on trying the bath, found the same result. I then added 2 ounces of distilled water to the bath (6 ounces) filtered, and then added 100 grains of nitrate of silver; tried a plate, but with no better success.

The bath gave an acid reaction, and I neutralised it with carbonate of soda: still the same result. I then acidified it with nitric acid and tried again, but found it no better. As a last resort, I precipitated the whole of the silver in the form of a carbonate, and then reduced it with nitric acid; after saturating with iodide, testing, and finding the bath in an acid condition, I again tried a plate, but still with the same result.

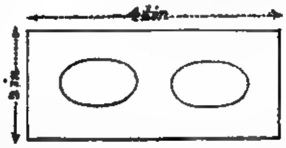
Can you inform me the cause of the peculiar action of the bath? I have named the circumstance to several photographers, but they have not met with a similar difficulty.

P.

[We are quite at a loss to suggest a reason for the above. The effect is quite at variance with our own experience on the subject and also with theory. Perhaps some of our correspondents have met with a somewhat similar result; if so, will they favour us with their experience? So strange and abnormal a condition of the bath deserves investigation.—Ed.]

A STEREOSCOPE WITHOUT LENSES.

SIR,—Make a box of cardboard, or thin wood, 6 inches long, 4½ inches wide, and 2 inches deep. In one end of this cut two holes to serve as eye-pieces; if these holes are long instead of round, they will be better adapted for various eyes, thus:—

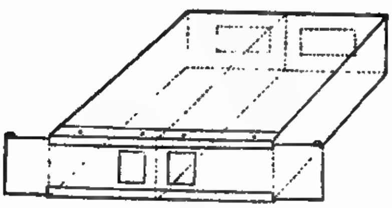


or, if it is preferred, two short tubes may be inserted in slides, as in some stereoscopes, so as to admit of adjustment. At the opposite end of the box, cut two rectangular holes, 1¼ inches by 1⅜ inches; separated by a distance varying from ¾ inch to 1¼ inch. It will be better to cut these holes in separate pieces of tin or card, and to make them slide in grooves at the top and bottom of the box. A diaphragm is to be fixed inside the box, so as to keep the pictures to their respective eyes. The inside of the box is to be blackened.

Hold a stereogram in one hand, at a distance of 6 or 8 inches from the end of the box; look through the eye-holes; then if, when the eyes are shut alternately, one picture appears at each rectangular opening, when both eyes are opened together the stereoscopic picture will appear.

The easiest method of adjusting the openings, is to look through the box at some rather distant object, say the opposite side of the room, and, if the same field of view appears in each, they are properly adjusted; and if the stereogram be interposed at the specified distance, still keeping the eyes as if they were looking at the wall, one stereoscopic image will be seen.

The whole box looks something like the following:—



The dotted lines are the parts which are not seen.

X. P. R.

POSITIVE PRINTING.

SIR,—I have seen very frequently in the "NEWS" inquiries as to "How the tint on the pictures, reviewed at vol. i. p. 281, was obtained?" Together with the reply, viz., "We do not know—it is a secret." Knowing that difficulties, by perseverance, may be overcome, I now give you a formula which will give you that tint with great permanency:—

Exciting bath—

Nitrate of silver	35 to 40 grains.
Distilled water	1 oz.

Float five minutes, and dry; print moderately deep; wash in water two hours; then in salt and water from five to ten minutes—1½ oz. to 5 pints; then immerse in the

Toning bath—

Chloride of gold	5 grains.
Distilled water	10 ounces.
Carbonate of soda	80 grains.

Let the print lie in this until a dark brown (not a purple) tone is obtained; then remove, and wash in the following bath:—

Soda (for washing purposes)	5 ounces.
Water	1½ gallons.

Let the print remain from seven to ten minutes, and then fix in

Hyposulphite of soda	6 ounces.
Water	20 ounces.

Let the prints remain for fifteen minutes, and use fresh hypo. every time. Wash well for 24 to 36 hours. You may get a nice purple tone if the print remains long enough. Canson's paper is the best, but Papier Saxe is pretty good.

SILVERPEN.

MAXWELL LYTE'S GOLD TONING PROCESS.

SIR,—In Mr. Maxwell Lyte's beautiful gold-toning process, which I have tried with great success, "*Spanish white*" is used with the hypo. bath. Now, there are two Spanish whites, one—that which I have used—is trisnitrate of bismuth, which gives the hypo. solution a dirty brown colour, but does not seem to be at all detrimental to the print. The other Spanish white is the softest and purest white chalk, which I have *not* tried.

I should feel very much obliged if you would inform me which Spanish white is correct, and *why* it is used.

SPANISH WHITE.

[Our correspondent has used the wrong article. White chalk (carbonate of lime) is the one intended by Mr. Lyte, and its object is evidently to prevent the possibility of the fixing bath becoming acid by use, which it would effect by combining with the acid and forming a lime salt, with evolution of carbonic acid.—ED.]

SPURIOUS ALBUMENISED PAPER.

SIR,—Considering the large number of individuals—professional, quasi-professional, and amateurs—who practise the photographic art, and the consequent patronage which dealers in material enjoy, it seems to me rather too bad that deception and cheating should thrive as they do.

For instance, I inclose you two pieces of albumenised (?) paper, purchased at ——. When floated on the sensitising bath it quickly parts with its glossy surface, and is quite unfit for printing: in addition to which, it rapidly discolours the silver solution.

In my opinion it is glazed either with gelatine or gum—certainly not with albumen.

From sympathy with any unfortunate person who may have been duped to the same extent as myself, I have been induced to trouble you thus, hoping that the deception that has been practised may be my excuse. T.

PHOTOGRAPHIC QUOTATIONS.

A correspondent has favoured us with the two following photographic sentences; a collection of similar classical allusions would be of interest to many of our readers:—

"—— a principiis adscendit motus et exit,
Paullatim nostros ad sensus —— ut moriantur;
Illa quoque in solis quæ lumine cernere quimus
Nec quibus id faciant plagis ad paret aperte."

LUCRETIUS ii. l. 140.

"Res ita convortant formas, mutentque colores."—*Ibid.*

We have several times, in the course of our reading, met with similar curious allusions, and will, in future, make a note of them for the benefit of photographers. A facetious friend has suggested the appropriateness of Shakspeare's—

"Show his eyes, and grieve his heart;
Come like shadows, so depart."

As a motto for a collection of photographs.

ANSWERS TO MINOR QUERIES.

WAX IN COLLODION.—*Bungler* complains of reticulated cracks forming over his collodion positives when drying; he is aware that this is owing to the employment of inferior collodion, but asks if we cannot suggest a remedy which will allow him to use up what he has by him at present, as he cannot afford to throw it away. We have found that the addition of a few grains of pure white wax to an ounce of collodion much increased its toughness, without in any

way injuring its good qualities, and we would therefore suggest the addition of this, or some body which might act in a similar way (such as India rubber, which, however, we have not tried), in the proportion specified above, as being likely to improve the inferior collodion, if it does not entirely remove the reticulation.

Reduction of Silver Solutions.—*J. Broadley* has accidentally poured about 10 ounces of a 60 grain silver bath into 6 ounces of positive developing solution, and now asks how to get the silver from the same. Place in a flask, and boil it until the reaction between the developing solution and nitrate of silver is complete, and no more precipitate falls; then, if silver still remains in the solution (which may be told by a drop of salt solution forming a precipitate in a small quantity of the filtered liquid), add more positive developing solution until all the silver is precipitated. Then filter or decant from the precipitate, boil for a few minutes with dilute hydrochloric acid, and wash well until some of the solution filtered off is no longer acid to test paper. The result will be metallic silver in the state of a grey powder.

Removal of Silver Stains.—*S. A. H.* A correspondent, "Raven," has informed us that he has found, from experience, that the best thing to remove stains from the fingers is bichloride of mercury dissolved in warm water; dip the fingers in, and the stains disappear by rubbing.

TO CORRESPONDENTS.

Proposition for Exchanging Stereoscopic Pictures.—In our next number we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed, a picture be forwarded with it. We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score. The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

Since we first published the above, we have received several communications, suggesting various alterations, all of which have been carefully considered; and the conclusion at which we have arrived has been, that to make any alterations would be unadvisable, and would, possibly, open the door to misunderstanding. The suggestion which was made in two or three cases was, that it should be allowable to send the pictures unmounted, as it would give greater facility of transmission through the post-office. With respect to the latter reason, we think our correspondents are in error. A mounted picture can be sent through the post for a penny, and the card serves as a protection. Moreover, we are convinced that the convenience of those who desire to exchange will be far better consulted by making it imperative that the picture should be mounted, as a very little consideration will show; because it must, as a matter of course, be less trouble to mount twenty pictures all alike than twenty different subjects. We amend our proposition so far as to suggest that any gentleman who desires to exchange two or more pictures from different negatives, can have it so stated in the printed list. We must remind our subscribers that they must send their names without delay, as the list must soon be closed.

Photographs in Natural Colours.—"A Subscribing Amateur," "J. W. W." "Victor," and other correspondents have written, in answer to the article on the above subject, which appeared in vol. ii. p. 17, to say that they have partially succeeded in accomplishing this desideratum. If they will kindly forward a specimen or an account of the process, we shall be happy to give the subject all the prominence which so important a discovery deserves.

F. L. G.—Your solutions containing gold may be mixed with the silver residues, and the whole reduced together, first to the state of sulphide, and next to the metallic state as described in our first volume. On dissolving the metallic silver in nitric acid, the gold will be left behind as a dark brown powder, which assumes a metallic aspect when burnished.

R. M.—1. The specimen of paper is both salted and albumenised, and may be rendered sensitive in a 60 grain silver bath. 2. See p. 43, vol. i.

C. H. Paine.—1. The spots arise from a drop of some chemical, most probably hypo., having touched the paper in one of the previous stages of its preparation. 2. We do not advise you to discard a process which you are proficient in for a new one, however highly spoken of. You can, however, try the collodio-albumen process. 3. Consult vol. i. pp. 72, 88. 4. We shall be happy to insert your name upon the conditions mentioned above. They have been framed to suit the wishes of the majority.

H. D. H.—A correspondent who favoured us with a letter signed "H. D. H.," which was inserted at p. 142, vol. i., is informed that we have a letter waiting for him. To what address shall it be sent?

W. L. C.—1. You will find it advisable to keep some pieces of metallic cadmium constantly in your stock bottle of collodion. 2. We have seen some very excellent reflectors made of earthenware coated with a reflecting surface of metallic platinum, but we do not know where they are to be procured.

H. S. L.—1 and 2. Will be answered in our "Answers to Minor Queries." 3. We will endeavour to do as you wish.

A. Elsden.—From the description your camera must be a very excellent one, and well worth bringing before the public. More than this we cannot say unless we were to see it.

J. W. G. Gutch.—Received.

F. S.—In the question the words "previous to" should have been "after."

G. Restall.—Your picture is a very good one, but still our opinion is unchanged; we think the ordinary negative process would have given you a better picture of the same subject. We can see several faults in it which may be traced to the intensifying process, although it is one of the most perfect specimens of a print from an intensified positive that we have seen.

J. Heywood.—We cannot insert your name except you comply with our regulations. You attach too many conditions to the proposed exchange, and your specimen print is not sufficiently good to render it desirable to comply with them.

H. F.—The process is described at vol. i. pp. 56 and 83.

H. Bath.—Received.

C. C.—The gun cotton with which the collodion is made is not good, or there is too much water in the alcohol and ether used as a solvent. Collodion by a good maker should not give that reticulated appearance on the picture.

L. D'Esloux.—Received.

Earnest.—1. Of the processes you name we decidedly prefer the wet collodion; next to this the waxed paper and calotype processes. 2. A furnace suitable for the reduction of residues can be obtained at most wholesale dealers in chemical apparatus.

A. Nicholson.—Received.

Louth.—The aplanatic are the best of those which you have mentioned.

P. Y. G.—Your photoglyphic print is very successful; and with a little more practice you will, we doubt not, succeed in producing some excellent pictures. The copal powder is not fine enough, and the *biting in* process has been continued rather too long, which has given a faint, flat appearance to the dark shadows. Your plate is, however, capable of producing a much better print than you have enclosed us, in the hands of one who has had experience in this kind of printing.

J. S. B.—Consult the article on the subject in No. 25.

A. T. Stafford.—1. Five ounces of hypo. to twenty-five ounces of water is the correct proportion. 2. From ten minutes to a quarter of an hour. 3. Mix an ounce of powdered Spanish white with the above quantity of hypo. bath; it will make a milky-looking liquid. 4. The operation need not be conducted in the dark after the print has been immersed in the toning bath. Too bright a light should, however, be avoided.

J. B. B.—We have not been able to procure the authentic account, but will give it as soon as obtained.

Rainbow.—1. We do not think the mixing of the two baths has anything to do with your "rainbow" hues; the fault is more likely to be in the pyroxyline. 2. We do not know where you can obtain the collodion you name.

W. Stonehouse.—Received.

Excelsior.—It will be best to purchase a camera on purpose. One may be procured at a very reasonable price.

R. E. T.—A lens such as you wish for may be purchased for about £4 10s.

G. S.—Gelatine, 128 grains; water, 14 ounces; absolute alcohol, 2 ounces.

H. H. Allen.—Received.

G. W. Y.—A process for obtaining the tint you so much admire (Ogle and Edge's) will be found in the present number, described by "Silverpen."

J. B. Robinson.—We are not aware that citrate of iron has been proposed as a developer; can our correspondent give us a reference to any published account of it?

T.—We think we best show our sympathy with our correspondent by publishing to our readers the fraud which has been practised on him, which we have done in this present number. Much dishonesty is practised in respect to photographic materials, and we do not think that any plan will prove so effective a preventative as making public a few instances.

Blue Light.—Our correspondent's suggestions are received, and will meet with due attention.

G. F. E. Hawke.—1. It would be impossible to throw any light on the peculiar fogging which you experience when taking a particular view, unless we were to personally inspect your whole operations. 2. Chloride, terchloride, and sesquichloride of gold are the same substance; the difference is due to a little uncertainty which at present exists in the chemical nomenclature, owing to the real equivalent number of gold not being yet satisfactorily settled. 3. Certainly; as many prints can be toned in succession in Maxwell Lyte's bath as is usual in such baths. 4. There will be no objection to your using bromide of potassium, provided you can succeed with it.

H. T. Taylor.—Judging from the plan you have enclosed, you have chosen the best aspect for the glass room.

G. Walker.—See Mr. Sidebotham's papers on the collodio-albumen process.

J. W. Love.—The cause of the stains on No. 1. is imperfect washing; the picture is fading out. The reason of the grease-like marks on the face of No. 2 appearing when you applied gum to the back is, that the soaking in water had dissolved out the size from the paper, and allowed the gum to soak through. Re-sizing the paper with gelatine, or mounting the print with starch paste, would have obviated this.

Enquirer.—Your nitrate of silver is most likely impure; it is to this cause that the weak solarised appearance of the light parts on over exposure is generally due. If that is not the case, add one grain of bromide of cadmium to each ounce of collodion, and put six grains of acetate of soda into twenty ounces of the nitrate bath.

J. E. Coward.—Received.

D. Combe.—If our correspondent will forward specimens to our office, his discovery shall receive every attention which it deserves.

D.—Your suggestions are received with thanks.

J. H., June.—Possibly your hypo. is impure. Increase the strength of the soda bath to 1lb. to the gallon.

T. Clark.—Received.

Communications declined with thanks:—Sir H. H.—A Platonian.—F. S. W.—Harry.—A. B. C.—M. L. O.—J. S.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Hypo.—A Subscriber.—S. O. X.—A Friend.—E. A. R.—O.—T. B. C.—Amateur.—W. C. E.—John W. W.—White Frost.—Folio.—X. L. N. T.—Harvey.—Nitrate.

In Type:—S. Highley.—J. W. Fall.—H. E. N.—T. G.—Beta.—J. N.—Thomas Clark.—J. G. Dear.—T. A.—W. L. S.—J. R.—T. B.—C. A.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 3d.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 31.—*April* 8, 1859.

PRINTING BY DEVELOPMENT AND OTHER METHODS.

As I have before stated, my opinion of our wants in photography is that the greatest boon any man could confer upon us, would be a really good printing process which we might use in any weather, and with great quickness. During the last three or four months any man would be sorely puzzled to take a great number of copies from a paper negative, either calotype or wax-paper—or even from a collodio-albumen plate, which prints much more slowly than plain collodion. It was to remedy this great want that I have been engaged some months in experimenting on printing by development, and now you have my results.

My first difficulty was to preserve the clean whiteness of the skies—this I never could accomplish with the serum (of milk) process—they always had a dusty appearance, and seldom possessed any brilliancy. My next attempt was with iodide of silver—in fact, a modified calotype—but the lights were so peculiar, and the shadows so "dead," that minuteness was all I could gain in that attempt. Then I changed to the citrate of silver; there I got both clean skies and minuteness, and whilst washing the pictures they appeared very beautiful; but *in drying* they lost all their brightness, and even a coat of good varnish could not restore them to their former appearance.

The reader will, doubtless, wonder what induced me to follow up so many failures, but when he hears that the finest plain-paper print I ever got during all my photographic experience was a developed one, he will no longer be surprised at my infatuation. The whites were ivory-like in softness, and the shadows so transparent and brilliant that no sun print could rival it. For months I tried to produce another equal to it, but could not; and, to this day, it is a mystery to me how that print could be so thoroughly different from others taken in the same manner and at the same time.

I now give you what seems to me the best developed printing process. Take any quantity of the whites of fresh eggs, and to each ounce of this add

Chloride of ammonium	... ...	4 grains.
Citrate of soda	... ...	4 „

and water sufficient to dissolve these salts; beat up well, as in other processes, and float the paper upon it for three minutes, hang up to dry; this will keep a long time.

The citrate of soda is made by neutralising 112 grains of pure citric acid with 133 grains of dry bicarbonate of soda. But in many places it may be procured at the druggist's.

To excite this paper use 30 grains nitrate of silver, 30 minims pure acetic acid, 1 ounce distilled water; float the paper four minutes at least upon this, and dry in a perfectly dark place. Of course the operator must be particularly careful not to allow the faintest light to fall upon it when it is, or has been, upon the silver bath.

The exposure is from one minute to ten, the best guide being the appearance of the print. If all, excepting the very lightest parts, is visible, the exposure has been long enough.

The next stage is the development. The greatest plague in this process lies here. Often have I washed my dishes with *strong* solution of cyanide of potassium, and yet the print has become marbled; whilst, when I have turned up the edges of the print, making it into its own dish, I never had a single stain: the print should not be over-developed, as it loses nothing in fixing or toning. A saturated solution of gallic acid is used for this, and as the print is never washed before development it needs the addition of no silver whatever. If the room, however, is *warm* in which the print is developed, a mixture of equal parts saturated solution of gallic acid and water is strong enough.

To fix, use one part hyposulphite of soda in six parts of water, and allow it to remain in this solution 15 or 20 minutes.

The prints may be toned with gold before fixing, as in other processes; but, if possible, until they are placed in the hyposulphite, they should not be brought into the light; as, even after well washing when developed, they are very liable to be rendered dirty-looking by the light.

This has proved, in my hands, the very best developing process I have ever attempted to print by. It has, however, one fault—the *only* drawback to this mode of printing—the pictures are often *hard*, and want smoothness in the half-tones; yet, for one class of pictures, it is better even than sun printing, viz., the copying of old manuscripts, etchings, &c. A few months ago I copied an original etching of one of our old masters; and, as the weather was bad, printed the copies by the above method, and they proved about as perfect as they could well be. In this class of picture, too, if the exposure of the print is not quite so long as usual, the development has of course to be pushed a little further, and then the picture needs no toning, the hyposulphite not causing enough disagreeable redness to injure it at all. Etchings brought out in this way are beautifully clean; and the albumen in common objects prevents the lights sinking, and so gives much better pictures than the plain paper.

One observation I have to make on the common sun printing process. Why cannot every seller of albumenised paper label it as prepared with the quantity of chloride used in its making? Day after day I am asked by friends what causes a mottled appearance on their prints—the fact is, they have been using one man's paper, prepared, perhaps, with six grains of chloride to the ounce, and then they get some other make, prepared with 20 grains. Even an old photographer often spoils by this omission a lot of sheets before having tried them. One or two of our best men do attend to this, but not one in twenty. Θ

CAUTION TO PHOTOGRAPHIC ARTISTS.

A case of some importance to photographic artists has lately occupied the attention of one of our metropolitan police courts, wherein Mr. Brooks, a photographic artist in Oxford-street, summoned Mr. H. Mills, a tobacconist, his neighbour, for wilfully destroying two portraits exhibited in his show-case as specimens. The defence was that the portraits were likenesses of the defendant's wife, and were exhibited without his consent after he had several times complained of the act. On hearing the case, Mr. Bingham, of whose high magisterial ability no one can raise a doubt, deemed it of sufficient importance to take time in considering his judgment before delivering it; or, in other words, to afford him time and opportunity to investigate the law of the case, and, if possible, to find a precedent or authority to guide him to a just decision. For this purpose a week's adjournment took place. On Saturday last, Mr. Bingham, in giving judgment, said:—"It appeared that the complainant had purchased the business of a photographer, together with the stock, which contained, among other articles, the portraits of defendant's wife, and these portraits were hung up at his door as a specimen of his style of art. The defendant

requested that they might be removed, but this request being refused, he obtained his end by destroying the works with a stick. Whether an artist, an alehouse-keeper, or any other person might, after notice of objection, seek to attract customers by hanging up a portrait of his neighbour's wife as a sign, either for its beauty or deformity, was, at least, very questionable; but, even if the exhibition was a nuisance, which the law would compel him to abate, it was clearly unlawful for the defendant to redress his grievance by violence. He must, therefore, pay for the damage done; but, inasmuch as the exhibitor was, under the circumstances, entitled to no sympathy, the amount must be limited by a rigid estimate. The defendant must, therefore, pay one guinea for the damage, and 2s. costs of summons."

We think no one will quarrel with this decision; the defendant was clearly wrong in the course he adopted to obtain redress for his grievance; but does that make the complainant right? That is the question which has induced us to transfer this case to our columns, and to give a friendly caution to those of our readers who may find themselves in a similar position to Mr. Brooks. We can readily comprehend the feeling of this gentleman, in standing upon what he believed to be his rights, in exhibiting that which he had paid for, and in following the example of his brother artists. Whether the superior Courts of Law or Equity would uphold that view of the question seems very doubtful; and, in the absence of any reliable judicial authority on the subject, which we must assume to be the case in the absence of all reference to one by Mr. Bingham, we would not recommend our photographic brethren to covet the martyrdom of trying the question with another Mr. Mills, who, being less irate, might proceed more skilfully to accomplish the object of compelling the removal of a portrait, in which he might be deemed to have a personal interest, at the expense of the exhibitor. However little the cost might be, we would not recommend the attempt, not only because we feel that the exhibitor would become a martyr in his endeavour to maintain a supposed right, but for a reason which, we venture to think, in the interest of photography, should be paramount with all who are engaged professionally in the art, and that is—*not to offend the public.*

We should hold it to be exceedingly bad taste for an artist, even if the law clearly permitted him, to continue to exhibit the portrait of a person to whose feelings it was offensive. No good object can be gained by it, and we see no necessity for showing up people in private life, who do not covet the honour of a niche in a photographer's specimen case; while there are so many, who, in the language of the immortal Barnum, "if not kept well before the public, languish and die."

It may, however, be interesting to photographers to know that our cousins over the Atlantic have also had a little turn at litigation upon a photographic matter, in which the question of the right of photographers to publicly exhibit a portrait was accidentally introduced, and had a bearing on the case with reference to the rights of the parties. The case is that of "Jeremiah Gurney *v.* Elias Howe." Without troubling our readers with the particulars of the case which it is not our object to dilate upon, we refer to the fact, that the plaintiff had publicly exhibited a portrait at the Crystal Palace Fair of 1857, and thereby, as the defendant contended, had adopted the picture as his own: that such exhibition had been without the defendant's leave and licence, and he, therefore, sought to repudiate his liability to pay for the picture for that and other reasons. The court and jury, however, took a different view of the case, and returned a verdict for the full amount sought to be recovered. It does not appear, in this case, that the defendant had taken any steps to object to the exhibition of his picture, and it is to be inferred, therefore, that the jury, in the absence of any protestation on the part of the defendant, would deem him to have acquiesced in the public exhibition of the picture by the plaintiff, and, therefore, not concede to the defendant any benefit of such a point of defence.

COMPARATIVE EXPERIMENTS ON SOME OF THE DRY PROCESSES.

BY MR. JOHN DRAFFIN.

I have noticed lately in your valuable journal several communications on the value of certain dry processes. Now, I have, for the last twelve months, been professionally engaged in the "stereo trade," and have made a series of experiments to enable me to ascertain, for a certainty, the process most suitable to me for out and in-door work. I have, now, for several years practised the collodio-albumen process; but as a late and lamented friend of mine (Mr. Hepworth, of Manchester, an old collodio-albumen practitioner) strongly recommended me to try Fothergill's process, I determined to work for some time with the following, viz.:—Taupenot's, Norris's, and Fothergill's. Every negative I took for several weeks I made three copies of, viz.:—one by each process. To make sure, I had separate baths for each, and to be doubly sure, a friend of mine and myself have had, at different times from a London house, plates prepared by Norris's, and Fothergill's process.

I will take Fothergill's first; I have obtained some good negatives by it, but the time expended is double that required by either Norris's or Taupenot's; and for interior views it is utterly useless.

Respecting Norris's, I cannot speak too highly of it. I have done some very good things indeed with it, but the exposure required is longer than Taupenot's, and for interior views I have not done so well; still, if I wanted to abandon the latter I should certainly prefer Hill Norris's to any other I have tried.

Now for the collodio-albumen; the inclosed picture may be shown as a fair specimen of what the process can do; worse subjects you could scarcely have, owing to the want of light, even the little I had came through tinted glass, as you will scarcely find a plain window in York Minster. The "Organ Screen" is situated in deep shade, yet I obtained what you see in 45 minutes; the "South Aisle," which is full of tinted glass, I obtained in 25 minutes; the "Tomb" in Lady Chapel, in 20 minutes. I could show you other subjects quite equal, taken in the same building, but on which scarcely any light falls, and for which I have given an exposure of two days. Now, as I said before, I tried the other processes at the same time, but the result was a complete failure, and I am perfectly satisfied that the collodio-albumen process is *the one* after all. The exterior view, viz.:—the "Battery and Lighthouse" at Liverpool, I exposed on a bright day 45 seconds. I use a 4-inch focus lens, 3-6 stop. Now, how is it that some people can (at least they say so) obtain, by Fothergill's process, good pictures in 30 seconds with the same focus lens and stop I mention?

I shall not attempt to go into any details in the working of Taupenot's process here, because that has been so ably done of late by Mr. Sidebotham, suffice it to say that my mode of working has for some time been similar to his. I use two nitrate baths, and prefer a thin collodion and the albumen perfectly clear; in fact, I always allow it to stand three or four days before using, and then decant it off clear.

I shall be glad, if you wish it, to forward you prints of the three processes of subjects taken at the same time and exactly the same exposure.

I inclose a copy of the "Choir and Great East Window" of the Minster. Now, any one who has been in the choir knows what little light falls on to the woodwork. The picture I send is rather over-printed, but in the deepest shade you will find all the detail. Now, to obtain this picture I exposed for *four hours*, yet you see the Great Window has not suffered so much as you might expect after

such an exposure. There is a most remarkable thing connected with this negative, and that is—that in the window I have most distinctly the following tints:—*yellow*, *red*, *green*, and *purple*. I at first thought it might be an accidental deposit from the developer, but I find the same colour exactly in both windows and in the same places, and what is more, I have had the negative at the Minster and compared it with the window, and find that the red and green are correct with the shades in the window; I cannot account in any way for it, but so it is, and I shall be glad to show it to any one who may wish to see it. The picture of the Choir—(a singular specimen, unfortunately spoilt through "spherical aberration")—I took from the gallery of the Great East Window, but not having distance enough, you will see that the mullions and pillars are very much out of the perpendicular; I think I can remedy this in another view I intend taking. But what I wish to call your attention to in this picture is, that I placed the camera in its place on Saturday evening, taking off the caps; I went for the camera on Monday morning, and, in developing, found I had caught two or three of the canons and choristers, in other respects the negative is not good; still you will observe in this picture detail in the deepest shade, and, of course, deep shade in a cathedral is deep enough and no mistake. You have had plenty to show you lately from several gentlemen, especially Mr. Woodward, of Nottingham, what the Taupenot process can do out of doors. I send these specimens to show what it can do *in doors*.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

The collodion prepared in the manner we have described and used at the proper time, ought to give a satisfactory result. Sometimes, however, and especially if an ether too high in the scale of degrees has been employed, it will be found that in the pictures it gives there is a want of general harmony. The blacks may have acquired considerable intensity, while the half-tones are barely indicated. In this case, the black deposit formed by the developing agents, will be rather plastic than crystalline; as a result of their prolonged action, the deposit becomes more and more irregular, and the design confused and devoid of clearness. This drawback is a very grave one; it is not, however, irreparable. Before we point it out, we will enter into a little consideration of the intimate structure of the sensitive film. This examination will, perhaps, lead us to a knowledge of the cause of the drawback we have referred to.

An examination of the manner in which the film which covers the collodionised glass is formed, leads to the discovery that this film, under the best and most favourable conditions, is not completely homogeneous and unique, but is composed in reality of two distinct superposed films, the one adherent to the glass, the other superposed on this. The first is pyroxyline, that is to say, normal collodion with a very little iodide; the second, on the contrary, is composed almost exclusively of iodide and very little pyroxyline. There is, therefore, something like a mechanical departure from the constituent principles of the collodion, a departure which has no other cause than the sudden evaporation of the alcohol and the ether placed in contact with the air over a large surface. An effect is produced in that case comparable with that which takes place on the drying of sized paper. According to M. Payen, the liquid size, introduced uniformly into the pulp of the paper, becomes, as a consequence of the desiccation by the air, fixed on each surface of the paper alone, while the interior itself retains scarcely any. For the sizing to be perfect, a combination of favourable circumstances is requisite, in which the humidity and the ambient temperature play the principal part. The iodides dissolved in the collodion are, therefore, brought to the surface of the film opposed to the glass, in the same way as the size introduced into the substance of the paper attaches itself to each surface. And as a paper is never really well sized, except at its surface only, so a really well-prepared collodion is only good so far as it will allow the iodides to move freely to its surface in contact with the air.

Under such conditions the film of iodide is very easily permeable to the sensitising and developing agents thus brought in immediate contact with a perfectly divided, and a—so to speak—spongy matter. It will be readily conceived that if the conditions of texture are different, that is to say if, from a vicious preparation, instead of a spongy superficial film, we have one very compact, in which all the principles are energetically retained, there will be a much greater resistance to the sensitising agents, and a much more difficult access will be presented to the developing agents called in to complete the sun's labours.

Collodions prepared with a strongly rectified alcohol and ether are subject to this fault of impermeability, and, for this reason, we are opposed to their use. It may sometimes happen though, that, even with alcohol and ether less highly rectified, this fault will present itself in a more or less marked degree. If it is not very strongly marked, it may disappear after a few weeks from the reaction of the constituent principles of the collodion; but with time arrives another fault—the diminution of sensibility; it is, therefore, important to obviate the present evil. Now, there is a possibility of doing this very easily, and we may add, moreover, very efficaciously. It is only a question of modifying the molecular constitution of the collodion. Resin, which we advised to be added to the collodion for facilitating operations by the dry process, will, moreover, cause this fault to disappear. Resin, without taking anything from the tenacity of that part of the collodion film adherent to the glass, gives to the other part of the film which it supports greater permeability; hence, greater facility of access to the different baths, the successive actions of which it will subsequently have to undergo. We are not aware of the extent to which this addition of resin may be carried; but it may, without inconvenience, be carried to one or two per cent. of the collodion ready to be used.

* Continued from vol. ii. p. 40.

Lessons on Colouring Photographs.

COLOURING IN OIL—*(continued)*.

Third Painting.—The second painting thoroughly dry, the process of oiling out must be repeated prior to commencing the third painting. In this painting, the picture will usually be finished; extreme care will therefore be required, and no pains must be spared to obtain a faithful likeness, as well as an artistic picture. The various spirited touches which give life to the head must now be put in. Soften hard lines, especially about the hair and eyebrows; the shadows of the face may be again glazed with a warm transparent tint; points of high light, that are to remain unsoftened, must be put in with a light, firm hand, a small pencil being used for the purpose. The colour of the cheeks and lips must now receive their finishing touches, keeping them pure, and as brilliant, at least, as nature.

The draperies must now be retouched—strengthening the lights by bold touches, and deepening the shadows by another glazing where it is necessary. Finish the painting of the background, and examine carefully that no little point is neglected. The painting is then completed, and ready for varnishing.

The last process in oil painting is varnishing, by means of which the colours are made to bear out in their fullest freshness, brilliancy, and force, and, at the same time, the work is preserved from injury and decay. Where circumstances render it convenient, this is better delayed for a few months after the painting is completed. The reason for this is found in the fact, that linseed and other oils, in the process of drying, and by exposure to the atmosphere for the first few

months after their application, attract oxygen, and become decolorised, by which process the pigments with which they are mixed acquire additional purity. The picture should be varnished when this effect is produced, by which means further oxidation, which would result in the oils becoming again dark and discoloured, is prevented. In many cases it will be inconvenient, or impossible, for the photographer to allow this interval to elapse between painting and varnishing his picture. He must assure himself, however, that his colour is sufficiently well set before attempting to varnish, or he will inevitably ruin his work. Mastic varnish will be found, for many reasons, the most suitable for the purpose. Copal, and the hard varnishes generally, when applied to a newly executed painting, are very apt to damage it by cracking. It is eminently conducive to good varnishing, in all cases, that it should be performed in fine weather, in a room of moderately warm temperature; and that currents of cold or damp air should be avoided, as chilling or blooming of the varnish would probably be the result. If a varnish have bloomed, a very slight portion of oil rubbed over the surface, and then polished off with a silk handkerchief, will remove it.

In the limited space at our command, we could but briefly indicate methods and processes of painting in oil; we hope, however, sufficiently to enable the persevering student to set efficiently about the work, in which, by care, attention, aptitude, and much practice, he may become perfect. In our next lesson the use of water colours will come under attention. Meanwhile, we commend the following maxims in colouring, extracted from the valuable work on colouring photographs, published at this office, and by Newman, of Soho-square, to the careful study of the colourist; the principles laid down are equally applicable to every style of painting:—

1. Flesh as it retires from the eye appears to grow colder in tone.

2. The edges of all cast shadows are grey.

3. The high lights of flesh should be of a yellowish-white.

4. A judicious subordination of the half-lights to those which are more prominent ensures brilliancy.

5. As light is colour, every gradation to shadow is a gradation from colour; and shadows therefore should never be too bright.

6. Local colours are not found either in lights or shadows.

7. Cold colours, or those approximating to blue, retire.

8. Warm colours, or those approximating to orange, advance.

9. Contrasts give brilliancy of effect; but they should never be violent or inharmonious.

10. The style of execution should vary with the subject, to aid in expressing character;—vigorous and bold in a man, delicate and tender in a woman.

11. Colours should be laid with as little rubbing with the brush as possible, to keep them fresh and bright.

12. Avoid harshness. Let every line be softened; for in nature there are no real outlines, although the boundary of sight is distinctly marked.

13. Keep all cast shadows of one tone, and always warm (except at the edges), varying of course with the local tint.

14. Keep reflected lights warm, unless the object from which they are derived is visible; in that case, they partake of its especial colour.

15. Where the outline of a figure is ungraceful, it may judiciously be lost to some extent in the shadow of the background.

16. Massing lights and shadows together will ensure breadth and grandeur of effect. A skilfully-managed background will greatly aid in this respect.

17. Carefully preserve transparency in the shadows.

18. Colours should be kept pure and transparent; truthful to the subject, and harmonious both with each other and the nature of the picture.

19. Every part of the background should appear to retire from the figure, which should never seem to be cut in or inlaid.

20. The most careful manipulation and elaborate finish will be tame and ineffective without a perpetual attention to the proper preservation of breadth of light and shade.

(To be continued.)

Dictionary of Photography.

Carbonate of Potassa. This is a very important salt in the arts. It is prepared on the large scale from the ashes of plants; these are extracted with water, and the solution evaporated to dryness and calcined; the result is the crude pearlash of commerce. This, as might be anticipated from its mode of preparation, is very impure; it is purified by adding to a certain quantity of it its own weight of cold water; from the superior solubility of carbonate of potassa to that of the impurities, these are left behind, and, on evaporating the filtered solution to a small bulk, and allowing to crystallise, the carbonate separates out, in a comparatively pure state. If required in a still purer form, it is best to prepare it by igniting to redness purified cream of tartar (bitartrate of potassa), extracting the residue with water, and evaporating to dryness. Carbonate of potassa is a highly alkaline salt, very deliquescent and soluble in less than its own weight of water. It is insoluble or nearly so in alcohol. Its great attraction for water renders this salt of great use in the photographic laboratory, where it is employed for the purpose of dehydrating various substances. Alcohol may be rendered anhydrous by shaking highly rectified spirit with ignited carbonate of potassa, which forms a watery layer beneath the alcohol, or at least becomes pasty. The alcohol, whose density is then 0·815, is poured off into a retort containing twice its weight of pulverised and recently ignited carbonate of potassa, left to stand for 24 hours, and then two-thirds of it distilled off. Carbonate of potassa is also largely used in the manufacture of soap and glass.

Carbonate of Silver. Prepared by precipitating nitrate of silver with an excess of carbonate of potassa or soda, filtering, well washing, and drying the precipitate. If these operations are conducted in the dark room the carbonate of silver will be obtained in the form of a pale yellow powder, which will be found very convenient for the preparation of small quantities of silver salts, such as the acetate, &c., which may from time to time be required for experimental purposes. Carbonate of silver will remain unchanged if kept in a stoppered bottle in the dark, but it rapidly changes colour when exposed to light.

Carbonate of Soda. This is a most important salt to the photographer. Enormous quantities are made in England by Leblanc's process, which consists in forming a sulphate of soda by the reaction of oil of vitriol upon chloride of sodium. $Na\ Cl + HO.\ SO_3 = Na\ O.\ SO_3 + H\ Cl$. The sulphate of soda is then heated in a furnace with ground coal, which removes the oxygen in the form of carbonic acid, and leaves sulphide of sodium. $Na\ O,\ SO_3 + 2\ C = Na\ S + 2\ CO_2$. The sulphide of sodium is next heated with chalk (carbonate of lime), whereby the sulphur and carbonic acid change places, producing carbonate of soda and sulphide of calcium. $Na\ S + Ca\ O.\ CO_2 = Na\ O.\ CO_2 + Ca\ S$. The sulphide of calcium uniting with another portion of lime forms a peculiar compound insoluble in cold water, the carbonate of soda can be dissolved out and separated by filtration; on evaporating the solution to a small bulk, commercial carbonate of soda is deposited in large transparent crystals, which generally contain 10 equivalents of water. These crystals dissolve in two parts of cold, and in less than their own weight of boiling water; they fuse in their water of crystallisation when heated, and the liquid, if exposed to further continued heat, dries up to a white powder, which melts at a red heat without undergoing change; this is anhydrous carbonate of soda, and it will be

found very convenient if a large quantity of the salt is kept in this anhydrous form in the laboratory, as it is frequently wanted in the reduction of silver residues, &c. Solution of carbonate of soda has a strong, disagreeable, alkaline taste, and a powerful alkaline reaction. It may be purified by passing carbonic acid through a strong cold solution of the carbonate, when crystals of bicarbonate of soda will be deposited; these, after washing slightly in water, are heated to redness, when one atom of carbonic acid is evolved and the result is pure carbonate of soda. It should be kept in solution of the strength of about one part carbonate and four parts water; in this state it will be found of constant use for the purpose of neutralising too much acidity of the nitrate of silver bath; and for various other purposes.

(To be continued.)

A Catechism of Photography.

THE SEL D'OR TONING PROCESS.

Q. Allusion has been made to the sel d'or method of toning; is that process difficult?

A. It is not particularly difficult, neither is it troublesome in manipulation.

Q. Is albumenised paper employed in this process?

A. Albumenised paper may be used, though with less certainty of successful result than with plain papers. The Saxe papier is generally considered the best.

Q. How is the paper prepared?

A. By floating it on the following solution:—

Chloride of ammonium	80 grains.
Gelatine	10 ,,
Water	10 ounces.

Let it remain on this until it becomes quite flat.

Q. How is the paper sensitised?

A. By floating one minute on a solution of nitrate of silver, fifty grains to the ounce of water, or with ammonio-nitrate brushed on.

Q. How long should the paper be exposed to the light during the action of printing?

A. Only so long as to bring the light parts of the picture to exactly the depth they are to remain when the picture is finished, as the fixing bath does not reduce their intensity as in other processes.

Q. How is the process continued after the printing has taken place?

A. Every trace of nitrate of silver is removed, for which purpose the prints are immersed, face downwards, in a basin of water covered with a board to exclude the light. After ten minutes a teaspoonful of common salt is added, and the prints are allowed to remain in the solution for about five minutes longer. Next they are placed in a solution of—

Water	1 pint,
Ammonia	1 drachm,

until they turn red. They are then washed with running water, under a tap, and laid in a basin of clean water until the toning bath is prepared.

Q. How is the toning bath prepared?

A. In the following way:—Make a few ounces of solution of hyposulphite of soda, one grain of the salt to an ounce of water. Pour two ounces of this solution into a measuring glass, and add one half grain of the crystallised sel d'or. This is sufficient, when newly made, to tone eight or ten pictures.

Q. Will the solution remain good for a long time?

A. No; in a few days the hypo. solution, alone, turns cloudy and is then no longer fit for use; and when the chloride of gold is added it will decompose in a day or two.

Q. How is the toning solution applied to these prints?

A. Level a clean glass upon the levelling stand, and lay the print face upwards upon it. Pour on enough of the colouring solution to cover it, and watch the result. The red hue of the picture will pass in a few minutes to a délicate grey purple. When the tone is well developed, do not continue the action of the toning solution, but pour it back into the measuring glass. Hold the plate and picture for a few minutes under the running water, and afterwards immerse in a solution of hyposulphite of soda, one part hypo., six parts water. The print must then be thoroughly washed, and the operation is completed.

VARNISHING.

Q. Is it not usual to varnish photographic prints?

A. Yes. After being thoroughly washed and dried it is best to cover them with a coat of varnish.

Q. Is it generally regarded as an improvement?

A. It is, if well laid on, and the varnish be of a clear transparent consistency. It is better for some pictures than it is for others; and its employment is a matter of taste which each photographer must consider for himself.

Q. Is there no chemical advantage obtained by varnishing photographic prints?

A. Covering the print with a coat of varnish certainly contributes to its preservation from atmospheric influence, but it is only as a preservative that it is really useful.

Q. Does the print require any preparation previous to receiving the coat of varnish?

A. Yes; before attempting to varnish the print it is necessary to cover it with a coating of gelatine or pure white size. This, of course, must be laid on warm with a broad flat brush, and care must be taken that every part is well covered.

Q. Why is it necessary to use gelatine or white size previous to varnishing the print?

A. Because, otherwise, the varnish would sink into the paper, and utterly spoil the picture.

Q. What description of varnish is generally employed?

A. Different kinds of varnish are used; but spirit varnish will be found to answer exceedingly well.

Q. Most of the photographic proofs are mounted in a similar manner to that which is customary with regard to water colour drawings; is there any chemical difficulty in mounting?

A. None, with the exception of the gum, gelatine, or paste employed in attaching the print to the card-board. All materials that are of an acid nature should be avoided; sour and mouldy paste is also very objectionable; but anything which contains corrosive sublimate is worst of all. Dextrine, or gum, or gelatine, so long as they are quite pure, may be used without risk of injury to the photograph.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

[We have great pleasure in informing our readers that we have been fortunate enough to secure the services of one of the most eminent scientific men in France, as the special correspondent of the "Photographic News." By this means we hope to be able to lay before our readers the very earliest intelligence in all the branches of Continental science.—Ed.]

Paris, April 5, 1859.

An historical sketch of the new solvents for cellulose has been given by Mr. Crookes in the last number of the "Photographic News." This induces me to mention here that a note has just been published also by M. Van Monkhoven, entitled—"A new method of Photography with the aid of solvents for Cellulose" (*Comptes rendus*, 28 *Mars*, 1859), in which method cellulose is dissolved by an ammonio-cupric solution.

I have also seen a new memoir by M. Nièpce de St. Victor, which will appear shortly in *Cosmos*. The objections

that have been raised concerning the "new action of light" are here refuted completely. Both light and heat can be made, in these interesting experiments, to produce similar effects. But there are cases, as M. Nièpce shows in this new work, where the effects produced can be attributed to light alone (as, for instance, where the experiments with the insolated tubes take place at freezing point, or with substances which the heat of boiling water is not capable of affecting.) The remark lately published by Mr. Shadboldt, that the effects of light in M. Nièpce's tubes ought to be perceived through a glass negative, has no value whatever. In one of his earliest papers, M. Nièpce showed that these remarkable effects of light could not be transmitted through a sheet of glass, or a lamina of mica, however thin. It is also some time since M. Nièpce showed that heat was capable of aiding light in its mysterious action, and that the same agent taken alone could produce the same effect as light itself—an observation recently confirmed by Mr. W. Crookes. In the new memoir of which we speak, it will be seen that although heat has an action similar to that of light, we must be careful *not* to conclude that light has none. The fact that light in an active state can be shut up in a tube for a long space of time, and, at the end of that time, act upon a sensitive photographic paper *without any intervention of heat*, is incontestably proved.

M. Ponchet in a letter to M. Doyère, of Paris, denies the fact professed by many naturalists of the resurrection of dead animalculæ:—" . . . In 1701, Leuwenhoek announced to the scientific world a remarkable discovery. He pretended that after having killed certain *Rotifera* by complete desiccation, these microscopic animalculæ came to life again the moment they were touched with water. This extraordinary resurrection was confirmed by almost every naturalist living at the time, and afterwards by Hill, Baker, Coëze, Corti, O. F. Muller, Fontana, Spallanzani, &c.,—all these gentlemen believed in the phenomenon of resurrection, and you, sir, also assure us that this biological miracle is a reality. . . . Despite all the deference inspired by your works, I most absolutely deny this resurrection. . . . . Rotifera that are *really dead*, I assure you, never live again. What has led microscopists into error, is the fact that the dried body of these animalculæ, when moistened, imbibes the water and is elongated, becomes once more transparent and appears to live again. It is purely a physical phenomenon, and nothing more. . . . If the observation is continued for twelve or twenty hours, far from witnessing the spectacle of a resurrection, the viscera of the animalculæ begin to dissolve, or the body becomes swollen and the viscera expulsed. I am not the only person," continues M. Ponchet, "that holds this opinion. Oken, Rudolphi, Bory Saint-Vincent, Ehrenberg, and other naturalists of like reputation affirm, as I do, that they have never been able to resuscitate a single animalcule."

Paris, like London, has had its turn of the charlatanism of M. Vries, vulgarly known as "the Black Doctor." This is now probably finished. It was decided that M. Vries, who pretends to have discovered a remedy for cancer, should make a trial at the *Hôpital de la Charité*, where everything he could possibly desire was placed at his disposal. More than a dozen patients were offered him by M. Velpeau, and M. Vries engaged to cure them without any operation, by means of his antidote. The experiments began on the 27th of January last, and have been continued without interruption up to the present time. M. Velpeau has just laid before the Academy of Medicine their results, as follows:— "1st. The antidote for cancer is yet to be found; 2nd. M. Vries has not cured a single one of the cancers that we have submitted to his treatment; 3rd. All the cancer patients of our hospital have become worse and worse,—many of them will soon die; 4th. M. Vries has never cured a single case of cancer."

We have thus another proof that charlatanism cannot last; the truth will out at last. When asked whether, if after six months' experimentation the patients were no better, he would declare that he was mistaken, "the Black Doctor" answered—"No! if no cure cancer in de hospital, me cure dem in de town."

M. Liais addresses to Paris observations of Donati's comet made in the southern hemisphere. The celestial wanderer became visible at Pernambuco and Alagoas, during the early days of October. The numerous storms at Rio Janeiro prevented M. Liais observing it until the 21st of October. About this date the comet presented a great uniformity in the intensity of the light of its tail, which had only become a little fainter, perhaps, at the borders. The length of the tail was 21 degrees on the 21st October, and became gradually less and less until the 3rd of December, when its length was only 55 minutes. It disappeared completely, from the 3rd to the 6th December. A minute conical tail appeared about to form on the 8th, but disappeared on the 10th. The nucleus at this period appeared less concentrated towards the centre, and soon the comet became invisible to the naked eye. M. Liais, who had followed it from Paris, saw this remarkable comet for the last time, at Rio Janeiro, on the 23rd of January, 1859.

During the whole period of its visit to our part of the universe, the light of the tail and of the nucleus was found to be polarised, the plane of polarisation passing through the sun. According to M. Liais' calculations, the volume of the comet decreased slightly from the 21st of October to the 6th of December, and augmented after the disappearance of the tail, from the 6th December. The whole of the comet's light was found to be borrowed or reflected from the sun. This light was composed of two parts: the one regularly reflected and polarised; the other irregularly reflected and giving no polarisation. The latter was seen to decrease much faster than the first, which seems to indicate that a certain quantity of the nebulous matter was dissolved or deposited as the comet got farther from the sun.

Dr. Phipson has communicated an interesting paper to the Academy of Sciences, at Paris, on the action of *Santonine* on sight. Santonine is a white crystalline substance extracted from *Artemisia Santonica*. It affects the sight of those who take a certain dose of it, in a very singular manner: after a few hours, external objects appear coloured greenish yellow, or even green, blue, orange, red, &c., according to the dose and the person who takes it. There has been some discussion as to how this remarkable effect is produced. Some have affirmed that Santonine produces a sort of jaundice, during which the serum of the blood is tinted, and, circulating through the vessels of the eye, produces *coloured sight*. Others state that Santonine has a peculiar action upon the retina itself. Dr. Phipson has made experiments upon himself, with a view of throwing more light upon this obscure question. He experienced the same effects described by other authors, viz.: all *white* objects, and the *fire*, the *gas-light*, &c., appeared of a fine greenish orange tint. He has proved that Santonine, when introduced into the system, is oxydised and transformed into a new substance, which he calls *Santoneine*. This substance, which Dr. Phipson has produced artificially, in pretty greenish yellow crystals, soluble in alcohol, circulates with the blood, colours sight by passing through the vessels of the retina, and is finally expulsed from the body.

M. Miahle, a distinguished pharmacien of Paris, had already observed facts similar to those now brought forward by Dr. Phipson.

PHOTOGRAPHY IN ALGERIA.

To the Editor of the "PHOTOGRAPHIC NEWS."

MY DEAR SIR,—I hope all my letters reach you eventually. I don't expect them to reach you in very regular succession, and no doubt you sometimes get two or three at one time; but still I think the post-office at Algiers is very well managed, and when my letters once reach there, I have no fear of their reaching you—the great difficulty is to ensure their reaching that place. I am obliged to trust them to an

Arab who is going either to that place or Bone, and, as I am obliged to pay him beforehand, I feel sure that if he had a motive for stopping fifty miles this side of either of those places, he would use my letters to light his pipe without the smallest hesitation, and tell me when he comes back that he had posted them, and back up his statement by as many circumstances as a witness at the Old Bailey in proving an *alibi*. As to getting any letters that may be lying for me at the post-office at the former place, that seems out of the question. One man tells me that the officials refuse to give them up unless I apply for them in person; and a second, who has just now returned thence, says there are none, which is just what he would say if he had got them and lost them. Photographers, who confine their operations to that which is, all things considered, the prettiest and most interesting country in the world, can hardly imagine the anxiety with which one looks forward for letters when one is far away from home and friends—living among a race of people with which it is difficult to converse, and who are incapable of reasoning on any subject which does not fall within the experience of their everyday life, and these subjects are very limited in number. The Arabs, among whom I am now living, are grossly ignorant, and yet I firmly believe that they entertain the idea that what I know is as nothing compared to the profundity of their wisdom. Their conceit is quite ludicrous, and arises from their fanatical belief that the man who is not a Mahommedan must be little better than a Jew, whom they consider to be little above the level of their dogs in point of intellect, and infinitely below them as regards usefulness. The horror which the House of Peers would feel at finding a Jew sitting among them in a legislative capacity, would be as nothing compared to what these people would feel if a member of the tribe of Israel were to take his seat among them in private life. Even Hamed, who is my inseparable companion, and a man of inquiring mind, retains many of the prejudices of his countrymen, notwithstanding that I have laboured to show him that there are many things true which were never dreamt of in his philosophy. Any of your readers who may come out here would do well to remember what I have said of the Arab character, or else they may be annoyed by the assumption of superiority which the Arabs affect over white men who are such fools as not to believe in Mahomet. I would advise no photographer to come here alone, if he can help it, but to have a friend with him to assist him in passing away the time. I have been extremely fortunate in meeting with Hamed, who happens to be an agreeable companion, as well as a good man to have for a friend, on account of his influential position among people who would not have minded cutting my throat, when I first came among them, for the sake of my property. My position is altered now; I have joined them in excursions among the mountains against lions and tiger-cats—which latter, by the way, they seem to regard with much greater fear than the lion; probably on account of their being more frequently met with during the day, when, as a rule, the lion is crouching in his lair. I have just returned from an excursion among the mountains, which lasted five days. Our party was a strong one; beside myself and Hamed, there were twelve or thirteen Arabs, four or five of whom were mounted, the rest running along on foot, and keeping up with us without any difficulty. One of them led a horse loaded with my tent and camera, and a couple of my canvas water bottles, and a very queer object he looked—so much so, that the sheikh suggested that we should place him in the vanguard, as he was certain that, in the event of our meeting a lion, he was sure that he would run away from such a strange-looking animal; but I did not listen to the suggestion. I need scarcely say that we were all armed, though some of us carried guns which looked to me as if they would be far more dangerous to those who fired them than to the object fired at. We started at daybreak one morning, and reached the range of mountains we proposed to visit about five hours afterwards, when we halted to get something to eat. Our larder was not very plentifully supplied, nor with any great luxuries; but any photographers who may have injured their digestions by frequent dining with the Lord Mayor, will be certain to have them set right if they come out here and take up a residence with an Arab. Rice, mutton, and dates is the staple of their consumption, with unleavened bread and butter, and in our case with the addition of tea and coffee; but abundance of exercise, and the pure, clear atmosphere of the mountains, give one an appetite for anything; and while on this excursion I dined one day off lion, and with immense relish too, though the flavour is not precisely the same as that of "the roast beef of Old England."

I hope your readers are not tired of lion stories, for the fact is, that there is little else to write about from here. It forms the staple of the tales told by the Arabs around the evening fire; and if I were to believe all I hear on this subject, I should pronounce the lion to be the most ferocious, cunning, and blood-thirsty animal in existence. Not only do they say that the lion can fascinate, or, as I suppose electro-biologists would say, mesmerise, unlucky individuals who may come in his way, but he can do something far more wonderful: he can distinguish between a thief and an honest man; or perhaps, where all are thieves, it would be more correct to say, he makes a distinction between a greater or lesser thief. They tell me that the lion never attacks a man who is naked, and that, for that reason, those who are on a thievish excursion always divest themselves of their clothing. He respects their persons because they are engaged in an occupation similar to his own; but if a man retains as much of his clothing as is worn by a coolie in India, the lion looks upon him as one who is not heart and soul in his business—with much the same sort of feeling, in fact, as we at home regard a man who rows in gloves. He walks round and round him, playfully whisking his tale in his face, varying his amusement by occasionally stopping in front of him, drawing back his lips so as to show his enormous teeth, and uttering the most terrific roars. Farther on he will, perhaps, leave him and strike off into the wood; his wretched victim hurries along thinking that his tormentor has left him altogether—but all of a sudden the lion will spring from behind a rock, or an angle in the road, and with a stroke of his paw send him reeling backwards, precisely as we have seen a cat play with a mouse. When he is tired of this amusement he ends the dreadful anxiety of his victim by killing him outright. The man who is dressed in the ordinary way does not obtain even this horrible reprieve, for the lion lays hold of him and destroys him at once. If a party of naked Arabs are returning with their plunder and they meet with a lion, they wait respectfully until the animal has seized the beast to which he may take a fancy, and then continue their journey homewards, waiting until they think they are beyond his hearing before they venture to call him the most opprobrious names, for they entertain an opinion that the lion understands what is said to him.

We were rather fortunate our first day, for we shot three hares and some birds, which was a change of diet appreciated by all of us. I had no work to do, for nothing had presented itself of sufficient interest to induce me to unpack my apparatus during the day, so I had merely to assist in fixing my tent, and then we all sat down round an enormous fire, lighted as much for the purpose of keeping wild beasts off as for the sake of warmth, though it was very agreeable on the latter account, for it felt very cold to me, after I had dismounted and sat down for a little while.

Our encampment presented a very picturesque appearance. On one side of the enormous fire, that roared and sparkled in a way to frighten our horses at first, was my tent, in which myself and the sheikh were very snugly ensconced, and around which the Arabs were lying, or sitting cross-legged, furbishing their old guns, and afterwards loading them with as much care as if an attack was imminent, though our number rendered this very unlikely. The horses were brought

within the circle of light, and not only fastened to pegs driven in the ground, but hobbled, so that they got very little to eat beside what they were able to get between the time of our halting and its getting dark; this was done with a view to protecting them from lions and thieves, and their safety was further cared for by the Arabs, whose duty it was to act, in turn, as sentinels during the night.

After our meal was finished, the pipes were brought out, but the natives artfully waited to see the extent to which my liberality would reach before they produced their own tobacco; and as nothing is lost by kindness, and I often require assistance, which they might refuse to render me, I find it advantageous, after Hamed and I have filled our pipes, to abandon the remainder of the packet to them to divide as they please. Apart from the pleasure one always feels in doing a kind action, this is really a very inexpensive way of securing the good offices of these half-savage Arabs, for tobacco is grown in very large quantities in this country, on account of the French Government, and may be bought at a low rate.

[The remainder of our correspondent's letter will be given in our next.]

THE STEREOSCOPIC EXCHANGE CLUB—THE COLLODIO-ALBUMEN PROCESS—GOLD TONING.

Honoured Sir,—In the "Photographic News" of March the 18th appeared a proposal about the interchanging of stereograms between amateurs. I think this a very happy idea, and take the liberty of asking you to put my name upon the list. You propose to send them duly mounted, in fact, ready for the stereoscope. I am afraid, however, that in this way the carriage will be rather high; and if any of your countrymen or subscribers would favour me with an exchange, I should prefer to receive the stereogram not mounted, in an ordinary envelope, and a few words about the exposure, lens, process, kind of paper, &c., not, of course, a full grown letter, but only a few indications on a slip of paper. I think this would constitute a real *enseignement mutuel*, and be of the greatest advantage to all amateurs, whereas the mounting might be done by every photographer himself, for I suppose that nobody is without his passe-partouts and mounts.

The eulogium you bestowed on Mr. Sidebotham's collodio-albumen process has induced me to give it a trial; and I am exceedingly happy to have an opportunity of thanking this gentleman for his invaluable information. I have nearly tried all the dry collodion processes, and obtained only second-rate results, whilst I very frequently had the misfortune of seeing my film washed away, not to speak of other accidents quite as disagreeable. When due attention is paid, success is unavoidable to those who follow Mr. S.'s plan. I prepared twenty plates, and kept them for a week; I exposed them from three to five minutes with a single lens, the weather being rather cloudy, even rainy, and not one of them failed, whilst some gave me really superior results. However, I substituted the ammonium for the potassium salts, as my first experiments gave me some very small holes, which I ascribe to the latter crystallising. A little more free iodine would, perhaps, cure this defect. However, I have still to overcome a little inequality in the development, especially in the skies, and suppose that this might be done either by *immersing* the plates in the developing liquid until all the details are out, or by drying them after the second sensitising bath, over a vessel with steaming water.

Do any of your readers know, perhaps, a compound suitable for stopping out the skies *after* the plates have been varnished? I have been trying a mixture of gum arabic with bichromate of potassa (the glass having been previously heated), but this does not answer very well, as the liquid in drying forms little mounts, and spoils the ultimate results.

The fixing and toning bath at vol. i. p. 86 answer very well, only I suppose that the chloride of gold sold in England must be far stronger than the article I can get here. Your correspondent's formula is about 1 part chloride of gold to 3,000 of water. I left my pictures for *hours* in this solution, but the bronzed parts did not change colour, and, even with a toning bath three times as strong, it took an hour and upwards to have the desired effect. With an acid gold bath (1 : 1000) the change takes place in a few seconds, often instantaneously, which I think a great fault, as the best picture may be often spoilt irretrievably. I make my solution in the proportion of 1 grain gold to 100 water, and add the carbonate of soda, as it is easy afterwards to dilute it to the desired strength. The colour from pure yellow changes to green; is this right? I suppose it is, since the addition of a few drops of hydrochloric acid (of course by way of experiment) renders even to a very weak solution its bright yellow colour; therefore I conclude that my gold is deficient in chloride, and either more of it should be used, or less carbonate of soda be added. Would your correspondent oblige me by stating in which way the chloride of gold he uses is prepared.—I have the honour to remain, yours obediently,

Herman L. T. Haakman.

Amsterdam, March 29th, 1859.

[1. We are still of opinion that it would be found more generally advantageous if our suggestions of having the stereograms always mounted were strictly adhered to. The expense of postage (by the book post) would not thereby be increased in this country, and we do not imagine, after what we have said on the subject, that the Post-office authorities will throw unnecessary difficulties in the way of stereograms circulating by the book post on the Continent. Of course it will be always open to our correspondents to make what private arrangements they please with each other on this subject; but in the absence of such mutual understanding, much inconvenience will be saved by an adherence to our suggestions. 2. Perhaps the enlarged instructions on printing positives, given by our correspondent Θ, in vol. ii. p. 15. A recipe for making chloride of gold will be found at vol. i. p. 216.—Ed.]

PHOTOGRAPHS IN NATURAL COLOURS.

Dear Sir,—Does your correspondent, who says that he has discovered a method of fixing the natural colours in a photographic picture, inform you whether he has carried his experiments so far as to be able to produce something like certain results? I have no doubt many who have practised the art of photography have been charmed at times by seeing the natural colours produced in their pictures, but have been disappointed at finding they have all disappeared on drying. I have noticed the effect in a great many portraits I have taken in the open air with a white sheet placed between the sun and the sitter, the exposure almost instantaneous, and the picture developed with weak pyrogallic and acetic acids. In one instance only have the natural colours remained, and they are rather veiled, as if the face was reflected in a black mirror. I think it probable that the pure white light giving great brilliancy to the colours has something to do with producing the effect, but I consider the production of the colours so much a matter of chance, as to be of little or no value to photography. If, however, your correspondent has discovered some method attended with *certain* results, it is a most valuable discovery.—I remain, dear sir, yours truly,

Reigate, 24th March, 1859. Thomas Barrett.

Arsenical Paper Hangings.—The question whether paper coloured green with arseniate of copper (Scheele's green), used in papering the walls of rooms, gives off poisonous emanations is one which recent experiments have decided in the affirmative; and this, too, in quantities which render its use positively dangerous. At the same time the beauty of the colour, and the relief it affords to the eyes, makes the continued use of this coloured paper desirable. A very simple means of preventing these arsenical emanations may be found in the use of varnish; this, and the coating of size which precedes it, effectually isolating it from contact with the atmosphere.

Photographic Societies.

London Photographic Society.—C. B. Vignoles, Esq., F.R.S., in the chair.

After the minutes of the proceedings at the last meeting of the Society had been read, the Secretary read a list of the members which the council, in accordance with the request of Mr. Hardwich, had nominated to test the relative merits of the various kinds of collodion to be submitted to them by those makers who chose to reveal the formulæ employed by them in its manufacture.

Mr. Malone suggested that it was advisable that the commission should consist of others than merely practical photographers, and that considering how important it was that experienced chemists should be concerned in the examination of a compound containing such substances as bromine and iodine, he urged that the names of Mr. Maskelyne, Mr. Heisch, and Mr. Spiller should be added to the list.

Mr. Hardwich had no objection to the addition of the names of gentlemen so competent as those suggested by Mr. Malone, but appeared to think that it was more a question for practical photographers to decide. He thought that it would be very objectionable for the Society to be made the medium of puffing any particular maker, and that the commission should consider and publish the result obtained by a particular formula, without publishing the name of the maker.

Mr. Le Neve Foster thought the addition of the names proposed was not a matter which the members of the Society were competent to enter upon. It was the duty of the Council to decide as to the gentlemen who should form the commission.

The Chairman took the same view of the matter, but expressed his opinion that the Council would be perfectly willing to add the names proposed by Mr. Malone, though more as a matter of form than otherwise; the Society could not consider that now.

The Secretary read a communication from a Mr. Sutton, describing a species of vessel which he termed a schooner, which he considered would be a capital thing for photographers on an excursion, who might thus carry about with them, not only chemicals, but prog and other *et ceteras;* landing when they felt disposed to take a view of any particular spot. This exceedingly ingenious machine (which we may observe, in parenthesis, resembled a greatly elongated washing tub, with a piece of wood nailed to the bottom), would draw from one to two feet and a half of water—accordingly, we presume, to the stoutness of the photographer and the quantity of *et ceteras* he carried with him.

The reading of this communication was followed by a general titter; after which

The Secretary read a letter from Capt. Kater, referring to an examination he had made of the relative merits of the Voigtlander and Petzval lenses. We need not give his letter in full, as the conclusions at which he had arrived were precisely the same as those we published as the result of our own observations in our last number.

The Chairman invited M. Voigtlander, who was present, to make any remarks on the subject he felt disposed, but that gentleman very judiciously declined to avail himself of the invitation, whereupon

Mr. Mayall rose, and observed that he had long since tested the relative merits of the Voigtlander and Petzval lenses—that he had carefully measured their curves, and found them the same;—that he had subjected them to the same tests as that to which they had been subjected in our presence, and had arrived at the same conclusions. He proceeded to point out the importance to photographers of being informed as to the best description of lens for photographic purposes, and protested in energetic terms against the paper reporting the proceedings of the Society being made the vehicle of advertising any particular lens (alluding, we presume, to the so-called architectural view lens), and ended by moving the appointment of a committee to test the various lenses manufactured, with a view to coming to a decision as to which was the best for photographic operations.

At the conclusion of Mr. Mayall's speech, which was received with marks of approbation, a dead silence fell upon the meeting, which lasted so long that it seemed as if it had come to a premature end, until, with a view to reviving the discussion, the Chairman called upon Mr. Fenton by name, and begged him to offer any observations that might occur to him on the subject of Mr. Mayall's proposition.

Mr. Fenton had hoped that, as he was present in a private capacity, he would have been suffered to enjoy his *otium* (he was too modest to add *cum dignitate*), for that evening, but as he had been called upon to speak on this subject, he would do so. He then proceeded to argue from particulars to generalities;—that the subjection of two or more lenses to certain—and precisely identical—tests, with a uniformly superior result in favour of one particular lens, was no proof of the superiority of that lens over the other; and that to arrive at a correct conclusion on the subject, it would be a good plan for a certain number of members to test the lens under different circumstances during the summer, and, as we understood him to suggest, that the results should be compared at the end of the season. He was in favour of a committee being selected for the purpose as Mr. Mayall had suggested, and, after a few more remarks, resumed his seat amid very general applause, accorded, we presume, to the manner rather than the matter of his speech.

Mr. Le Neve Foster deprecated the time of the meeting being taken up by these discussions, which referred to a matter pertaining especially to the province of the Council. This body, he contended, was appointed to conduct the affairs of the Society, and, therefore, it was for the Council to decide what changes should be made in its management. If the Society was dissatisfied with the manner in which the members of the Council did their work, the proper course of proceeding would be to call a special meeting and dismiss them, and appoint others in their place; but, he could not consent to the society taking this matter into its own hands; and if these sort of discussions continued, he was afraid it would degenerate into a kind of debating club. The Council was perfectly willing to listen to the suggestions of any member; it had no desire to tyrannise over the Society, and anything that might be suggested would meet with its attentive consideration.

Mr. Malone supported the proposition of Mr. Mayall. He was aware that it was not the custom of scientific societies in this country to express an opinion, but he thought there was a precedent in the records of the Photographic Society for the appointment of such a committee as that asked for. He certainly thought that the time had arrived for adopting the mode of proceeding on this point followed by the *Académie des Sciences*, and the French Photographic Society. He made various other remarks to the same effect; in the course of which he was once or twice interrupted by the Chairman on trivial points.

The Chairman was of opinion that the appointment of such a committee as that asked for was not within the province of the Society; it rested with the Council, by whom such matters must be decided. He had no doubt of the entire willingness of that body to consider any matter in which the Society was interested; and he might mention that the subject had been discussed in its bosom on that very evening just previous to the meeting.

Mr. Mayall did not care from whom the committee emanated provided it was appointed; he, therefore, withdrew his motion, and left it in the hands of the Council.

Mr. Hardwich read a paper which he had drawn up hastily, in consequence of his hearing that a gentleman who was to have been present to read a communication was unavoidably absent through illness. His paper referred to some experiments he had made, in conjunction with Major Russell, as to the availability of one kind of collodion for both the wet and dry process. He did not find that the superiority claimed for a powdery kind of collodion in the dry process was borne out by experiment; on the contrary, the best results were obtained by using a hard contractile collodion. A plan he had tried for preparing plates for this process was, first coating the plate with a solution of India rubber, dissolved in benzol—which saved much trouble in cleaning the plate—and then pouring on the collodion, sensitising, and coating in the ordinary way, with albumen.

Mr. Mayall did not approve of Mr. Hardwich's suggestions. He thought that the object of photographers should be to simplify and not to complicate processes. That another dry process was not required, there being already so many that it would take the whole of the summer season to test them, if one wished to ascertain which was the best. He had seen pictures produced by a gentleman, by means of the honey process, which were the best he had ever seen. For his own part he thought

that a suggestion he had himself made to the Society some years ago, to adopt the use of the plain albumen process alone, would, eventually, be found to be the best, especially if the sensitiveness of the film was increased by exposing it to the vapour of iodine after sensitising. This gentleman's speech was interspersed with sundry small (very small) jokes, which relieved the mournful tediousness of the evening, and gave some of the least grave among the members an opportunity of laughing.

Mr. Malone did not in the least agree with Mr. Mayall, as to the capabilities of albumen. As to the employment of iodine vapour, he himself was the first to suggest its employment, and it could not be supposed that he was ignorant of what it was capable of accomplishing; but for all that, its sensitiveness was not at all comparable to albumen on collodion.

The discussion was continued for some little time longer in a languid and uninteresting manner, and soon died away altogether; upon which, after renewing the efforts he had several times made during the evening to animate the conversation,

The Chairman pronounced the meeting adjourned.

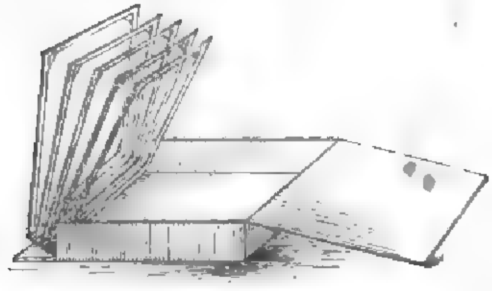
Photographic Notes and Queries.

IMPROVED PLATE BOX.

Sir,—A much simpler form of plate box than the one described by Euphos, in a recent number, but on the same principle, has long been in use.

A number of frames made of thin deal, similar to the frames of schoolboys' slates, are hinged together, so as to open like a book; a piece of silver wire, or better still, a piece of wood bevelled, so that only the extreme corners of the glass plates will come in actual contact, is inserted in the four corners of each frame. The bevelled side of the slip of wood is to be on what I will call the back of the slide, not the side on which the plate rests. The plate is laid with the collodion side upwards, so that the plain side rests on the four slips of wood, and when the next frame is laid upon one slide, the side of the plate on which the picture is comes in contact with the four bevelled sides of the slide next above it, and is thus kept from moving.

The *book* of frames is ingeniously enclosed in a deal box or case, in such a way that upon lifting the lid you may raise one or any number of the slides, and see the negative without touching or displacing any.



To remove a plate, it is only necessary to gently lift it at the back with one hand, so as to raise a corner for the other hand to lay hold by.

A box containing any number of these frames is not larger or heavier than the ordinary plate boxes. It was originally constructed by a clergyman, and the late Mr. Archer afterwards adopted it; and I have no doubt that it may be procured of the gentleman to whom Mrs. Archer made over all Mr. Archer's business.

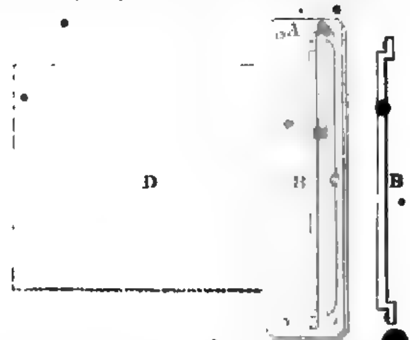
The lowest of the frames is hinged to the bottom of the box or case in the same direction as all the frames are hinged to each other. The side of the box next to the hinged sides of the frames must open so as to allow the book to open; the top lid also opens so that when the box is shut the top and side come together, and the one having a hook and the other an eye, the box is secured firm. Instead of hinging the frames together with brass hinges, they may all be cemented and screwed to a piece of flexible leather.

I have found that by cutting the grooves in the ordinary glass plate box in the shape of a V, the risk of tearing the collodion film is almost entirely removed—especially if the box be always held sideways while putting in the glasses, so that the back edges only rub against the groove.

The accompanying drawing will, I hope, explain the construction. H. E. N.

VICE FOR ROUGHENING GLASS.

Sir,—I have invented, and have found answer its intended purpose well, the following simple contrivance for quickly grinding the edges of glass plates for negatives, which is at the service of any of your numerous readers.



A, a piece of wood about 1 inch thick, and long as the longest side of the plate, screwed down to a bench to keep it steady. B, a small bar of cast iron, under which the glass is placed to be ground. C, another bar of iron or wood, that serves as a stop, giving the width of the glass to be ground.

By holding the plate of glass in the left hand steady against the stop C, then putting a little coarse emery and water between B and C, and giving a few smart rubs with a small piece of plate glass, held in the right hand, the glass will be most effectually ground in a short time.

Thomas Gulliver.

HINTS ON THE COLLODION PROCESS.

Sir,—The photographic working season being at hand, many failures will annoy beginners; so if you think the accompanying hints on the manipulating collodion plates—which I have compiled—will lessen their troubles, I shall be glad. If defects still arise, and these hints have been well followed, I think they may safely say it is not from the manipulatory division, but from chemicals, &c.

See that your camera is clean inside, the lens polished, and your chosen site the best.

See that your glass is well and truly clean.

Remember to wipe your collodion bottle free from crusts.

In coating with collodion do not pause, do not pour on too little nor too much, do not cause spluttering by holding the bottle too high.

Rock the plate *gently*.

When ready, immerse in the bath without a pause, and do not move it for a minute, then lift it in and out quickly, and let it stay till done.

Before putting it in the back, drain on *clean* blotting paper.

Do not let the back be in the light without a thick covering, nor let its vertical position be altered, nor shake the camera in uncapping; shut the slide *gently*.

Of two faults, don't under-expose.

See that your developing glass is clean; use enough solution to cover the plate easily, but, if possible, do not spill any.

Do not let any of the yellow iodide remain; and be sure all the fixing solution is washed off.

If the picture is faulty, find out why it is so before you try again.

Wash your hands constantly in plenty of pure water, avoiding soap. H. S. I.

NOTES ON POSITIVE PRINTING.

Sir,—In the paper process which I follow, I am extremely fond of using spirits of wine. Certain it is, that if the nitrate bath contain a small quantity, the papers will keep very much longer; and, it is quite a common thing with me to use papers that have been prepared a fortnight or three weeks.

With your permission, I will give you an account of the way I manage; and, if some of your readers would try it, they would be able to judge of its value for themselves.

Nitrate bath.—Nitrate silver, 1 oz.; distilled water, 8 ozs.; spirits wine, 1 oz.: float ordinary salted or albumenised paper on for five minutes, and pin up to dry.

After printing, immerse at once in the

Toning bath.—Hyposulphite of soda, 4 ozs.; water, 12 ozs.; spirits wine, 1 oz.: and, when dissolved, add 24 grains chloride gold, previously dissolved in 1 oz. of spirits of wine.

Immerse the print in this, turning it over now and then to prevent it from toning unevenly, and in about a quarter of an hour or thereabouts it will be sufficiently toned; then take it out, and rinse it well under a tap, and afterwards let it soak for about two hours, although, by the way, if I am in a hurry, I don't soak it at all, only rinsing it a little more. This done, dry it between pieces of blotting paper.

As you must perceive, this is very simple, requiring no hypo. bath afterwards; for, it is my opinion, that when the paper remains so long in the hypo., it becomes rotten, and this may, perhaps, be one cause of fading. I would merely state, in conclusion, that I have used this process for at least two years and a half, and am not exaggerating in the least, when I say, *I have not had a single proof fade in the whole of that period.* Thomas Clark.

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Sir,—Can you inform me whether stereoscopic pictures with descriptions at the back can be entered at Stationers' Hall, and whether an action could be brought for piracy with a fair chance of recovery?

In the shop windows of London are so many inferior representations of good pictures, that the natural inference is that they are *copies* only. Perhaps some of your readers could give examples of this species of robbery. This publicity might, I think, have a good effect. But surely some protection should be afforded by the legislature against this species of plunder? Beta.

[A stereogram may readily be entered at Stationers' Hall; but on inquiry there we were distinctly told by the gentleman who did us the favour to receive our money, that he could give no opinion as to the utility of such a proceeding. On referring to the Acts of Parliament on the subject, we are of opinion that an action at law against any one for a glaring case of piracy would result in a verdict for the plaintiff. The whole case of copyright in photographs is, however, in a very unsatisfactory state, and attempts are being made in more than one quarter to procure an alteration in the existing law. We will at once acquaint our readers with any steps which may be taken in this direction which may be likely to interest them.—Ed.]

IMPROVED DIPPER.

Sir,—I think the best kind of dipper is that consisting of a strip of glass with a piece of gutta percha lapped under the bottom, to break concussion, and it might be continued up the back of the glass to prevent it from breakage in travelling. James G. Dear.

THE "NEW ACTION OF LIGHT."

Sir,—I enclose—in yellow paper, for it is not fixed—a somewhat curious fern-print, which I have just found accidentally, under the following circumstances:—In looking over some white filter-paper, in a drawer containing also several books with portions of ferns between their leaves, I discovered the specimen in question; the drawer had been used, about six weeks ago, for keeping positive sensitised papers in, and several pieces still remained there, while odds and ends of ferns were strewed about.

I have every reason to believe that the filter-paper has *never* been exposed to the solar rays; it was brought home about eight or nine months ago, *at night*, and the contents of the drawer have been in *absolute darkness* for six or, it may be, seven weeks, or just before I had left London. I *know* the sensitised paper (*Canson's albumenised*) was not there *before* that time.

Moreover the temperature of the room during the same period has *never exceeded* 57° Fahrenheit, as I have just ascertained from *two* of my "*Compensation*" *maximum thermometers*, which, it may be necessary to remark, act *without moveable indices.*

On the preceding facts I need not comment—they must be sufficient to show that the specimen enclosed has been produced by the latent actinism emitted from the surface of the filter-paper, which the latter had acquired from *diffused daylight only.* W. L. Scott.

DISCOLOURING THE SILVER BATH.

Sir,—I get many little helps from the "Photographic News," for which I feel grateful. Recently it came to me just in time to save a very valuable silver bath which I had given up as lost. I dropped a black varnished plate into this bath—the varnish being made of bitumen, turpentine, and naphtha—and after this I was not able to get a good picture. I boiled the bath 15 minutes, and it turned almost as black as ink; I then filtered it many times, but it was still black. When I was just giving it up as a bad job, and concluding my bath lost, the newsman walked in with my "News." I at once made it my companion; and I found, on page 291, vol. i., "Discolouring of the Silver Bath, by H. Francis," and I commenced afresh with my bath; I put in 2 ounces of pipe clay, and in half an hour after this my bath was entirely cleared of that black matter. I have just filtered the bath twice, and it is as clear as crystal, and works very well. I respectfully thank you and Mr. H. Francis for this valuable help. John Rowlinson.

TONING POSITIVE PRINTS WITH COPPER.

Sir,—Enclosed are three prints, toned with *copper* instead of gold.

As I believe this process to be new, I [illegible]ormula:—

Hyposulphite of soda	[illegible] ounces.
Nitrate of silver	20 grains.
Nitrate of copper	160 grains.
Water	8 ounces.

Dissolve the hypo. in 7 ounces of the water; the silver in $\frac{1}{2}$ ounce; and the copper salt in the remaining $\frac{1}{2}$ ounce. Add the copper solution gradually to the hypo. solution, then the silver solution in the same way. Γ. Δ.

SENSITIVE PLATES AND THE CUSTOM HOUSE.

Sir,—I trust before long you will have some replies to the letters of W. W., p. 11, and Mr. Nicholson, p. 20 of this volume, as these letters express a want long felt in the amateur photographic world. Would you kindly insert a line, asking for the experience of any photographers who may have passed through any custom houses, English and foreign, with sensitive plates or papers in their possession—how they managed not to have their sensitive tablets spoilt by the examination of the officers? J. N.

FADING OF GLASS TRANSPARENCIES.

SIR,—Those gentlemen who may have purchased positives on glass of scenes in Switzerland, Germany, Austria, and other countries, some three years ago, as I did, will learn, with sorrow, that out of thirty glass positives nearly half of them are gradually "fading away." "The Castle of Heidelberg," "The Glacier of Tacconay," "Glacier of Rosenlau," &c., being among the worst. SILVERPEN.

ANSWERS TO MINOR QUERIES.

CLEANING DIRTY BOTTLES.—*H. S. I.* The way to clean a dirty bottle must, in great measure, depend upon the kind of impurity in it. Generally speaking, if the operator knows what has been in the bottle, a little exercise of his chemical knowledge will suggest an appropriate solvent; thus:—If the bottle has a deposit on it arising from hard water being left in it, rinsing out with dilute hydrochloric acid will immediately dissolve off the carbonate or sulphate of lime of which the crust consists, whereas it would require long continued hard rubbing to effect the same mechanically. Stains of iron, arising from positive developing solution or perchloride of iron having stood in the bottle, may be likewise removed by the same solvent; in this case, however, the acid must be used strong and slightly warm, as the deposit is more difficult to remove. Other impurities, such as oil or grease, require an alkali; thus, to clean a Florence flask, place in it a couple of ounces of hot water and half an ounce of common washing soda, and boil for a few minutes, shaking round so that all parts of the inner surface of the flask are brought in contact with the soda. Other kinds of impurity require special solvents to loosen them. Methylated spirits of wine and pyroligneous spirit (wood naphtha), will also be found useful; the latter especially, in cleaning out bottles which have contained collodion, and have a film dried on the inside, as it is a good solvent for pyroxyline; black varnish is also readily dissolved by this liquid. It is, however, unadvisable in many cases to resort to *chemical* methods of cleaning bottles until mechanical ones have been tried and failed, as even, if the latter do not perfectly succeed, they frequently leave very little to be effected by the solvent, thus avoiding unnecessary expense, for the value of a few minutes' labour is less than that of a chemical solvent; and, therefore, we advise the following plan to be tried first, and then if the dirt be very refractory, it can be treated chemically:—About half fill the bottle with pieces of filtering paper, and then put in a little coarse sand or fine gravel (about an ounce for a six ounce bottle), and just sufficient water to make the whole assume the consistency of paste when shaken up for some time. Now introduce the cork or stopper, and shake it violently for some minutes, turning the bottle round so as to make sure that all parts have been exposed to the friction; then add water and rinse it out, and in nine cases out of ten the bottle will be quite clean.

CHLORIDE OF GOLD.—*F. S. W.* has some chloride of gold, which, although it has been kept in a well-stoppered bottle in a warm room, has become quite liquid, and asks what can be done with it. The chloride being very deliquescent has merely absorbed water from the atmosphere *in spite* of the stopper (for no stoppered bottles are perfectly secure). The salt can easily be obtained again in the solid state by drawing off the water by heat, or it would be, perhaps, preferable, if the original weight of the chloride of gold were known, to add more water, until the strength is such that one fluid drachm contains one [illegible]loride. Any desired quantity can then be measured [illegible]d with greater convenience than if it were in the solid [illegible]

INSENSITIV[illegible]S ON WAXED PAPER NEGATIVES.—*Aliquis.* The cause of th[illegible]tches of insensitiveness occurring on your sheets of waxed paper is, that the sensitising solution has not remained sufficiently long on those parts, and there not having been the required excess of nitrate of silver in addition to the iodide of silver. The image was not impressed during exposure, and consequently could not develope. The negative looks as if it had been made sensitive by a small quantity of aceto-nitrate of silver on a glass plate, instead of employing a large quantity in a dish; the latter plan should always be adopted, as by the other method such patches are liable to occur.

THE STEREOSCOPIC EXCHANGE CLUB.

The following gentlemen, having approved of the proposition for exchanging stereoscopic pictures which we have recently made, and agreeing to the regulations contained in the "PHOTOGRAPHIC NEWS," vol. ii. p. 48, have forwarded to us their names and addresses for insertion:—J. W. Love, lecturer, Stewarton, Ayrshire, Scotland.—J. B. Robinson, Manchester and Liverpool District Bank, Macclesfield.—H. H. Allen, 2, Leadenhall-street, London. (Two or more pictures.)—A. F. Stafford, 2, Alderson-street, South Shields. (Two or more pictures.)—Alex. Nicholson, Dun-Edin Villa, Highbury New Park, London.—J. E. Coward, Twyford-place, Tiverton, Devon.—Thomas Clark, 2, Ordnance-terrace, Shooter's-hill.—H. Haakman, Amsterdam.—Thos. A. Jeffrey, Cheltenham.—J. H. Jones, 12, Williams-street, Swansea.—Rev. J. I. Dredge, Monmouth. (300 pictures.)—W. J. Skelton, Grimsby.—John Rookledge, Easingwold. (Two or more pictures.)—J. G. Dear, Baldock.—W. Brooks Reynolds, The Elms, Farringdon, Berks.—Dr. Towers, Hertford.—J. C. Twyman, 65, High-street, Ramsgate.—H. Hawker, Menheniot, Liskeard, Cornwall.—Count Wengierski, Osborne House, West Malvern.—Louis D'Elboux, Freemantle, Southampton.—Henry Bath, Longlands, Swansea.—J. W. G. Gutch, 16, Upper Victoria-place, Clifton.—H. Pain, Oak-hill, Surbiton, Kingston-on-Thames.—Wm. Stonehouse, 4, Abbey-terrace, Westcliff, Whitby.—Capt. Baxter, Mancetter Manor, Atherstone. (200 pictures.)—J. B. Leach, 10, Joynson-street, Bury New Road, Manchester. (Three pictures.)—Boughton Kingdon, Dix's Field, Exeter.—F. Lewellen, 4, Great Western-terrace, Westbourne Park-road.—G. Sheldon, Compton, Petersfield.—J. S. Overton, Crowle.—H. W. Loof, Bath-square, Tonbridge Wells. (Five or Six dozen pictures.)—J. T. Taylor, 81, South Bridge, Edinburgh.—C. Thomas, 61, White Lion-street, Pentonville, N. (Twelve pictures.)—George Restall, Payton-street, Stratford-on-Avon. (Two or more pictures.)—George Crabbe, Kirkaldy.—John Sang, Kirkaldy.—J. Heywood, 2, Willow-terrace, Moss-side, Manchester.

TO CORRESPONDENTS.

THE STEREOSCOPIC EXCHANGE CLUB.—We are indebted to several gentlemen for some valuable suggestions, which we shall carefully preserve, and, possibly, may avail ourselves of on a future occasion. At present we think that it would not be advisable to make any alterations in the rules we have laid down, until we find how the plan works as at present constituted.

NUNC AUT NUNQUAM.—Several minutes' exposure will be required for obtaining photographs of microscopic objects, if you employ no stronger light than ordinary daylight without sun.

CAPTAIN G. N. T.—Our correspondent's letter is received, with thanks.

AN AMATEUR (Queries on the albumen process).—1. The sensitising bath will always discolour. So long as it is not very dark it may be used, but when it gets darker than pale sherry, it should be decolourised by any of the methods recommended in our previous numbers. 2. and 3. The iodised albumen will keep for some months if a grain or two of camphor be put into the bottle with it.

J. BOCKETT.—1. We do not think that your stereograms, being chiefly portraits of private friends, would be such as the members of the club would care about having. 2. Add a few grains of metallic cadmium to your red collodion, and allow it to stand until the colour has nearly or quite gone. Its sensitiveness will be thus in some measure restored, although you will not succeed in making it equal to what it was when new. 3. See notice in another part of the "NEWS."

A SUBSCRIBER.—We do not understand what is the particular information for which you ask. No photographer need ask for "a method of taking direct copies on glass of photographic portraits with a half-sized portrait camera."

J. H. J.—We must decline giving an opinion on the safety of taking a bill of exchange from any particular London firm.

AMATEUR, ATHERSTONE.—Two letters received.

T. U. V.—Provided your lens is good, any good positive collodion ought to take a portrait in four or five seconds in a good light. Amateurs can seldom make collodion on the small scale equal to what can be purchased.

J. U.—1. We prefer an expanding camera with an accordion body. 2. Send a stamped and addressed envelope, and we will communicate with you.

J. F. W.—Your stereograms are excellent. We should much like to know the particulars of the process by which you were enabled to take them. The lenses, also, are very good.

E. S. C.—It is a well-known fact that a sensitive collodion plate, especially if it contains a bromide or has a reducing agent on its surface, will darken slightly if exposed to a strong light, even without development; but this darkening is very slow, and does not proceed far enough to make the fact of practical value.

J. B. LEECH.—If your old toning bath is treated as described in our first volume for the reduction of silver residues, the gold will be reduced to the metallic state along with the silver, and the former will be left behind in the form of a dark brown powder, when the metal is treated with nitric acid.

CAPTAIN S. S. B.—Your suggestions are received with many thanks, and shall meet with attention.

B. AND W.—J. H. J., &c.—It has been considered most advisable that the Stereoscopic Exchange Club should only consist of amateur photographers.

ZETETIC.—Received.

TRY AGAIN.—Your stereograms are very good; quite up to the average of such productions.

H. W. L.—Received.

T. P. BARKAS.—Our correspondent will see, if he refers again to the paragraph, the degree of credit which we attached to it.

WAVERLEY.—The best colour for you to paint the inside work of a glass house will be pale blue. We shall be glad to see your sketch.

G. B.—You added too much carbonate of soda. Filter your bath, and then add acetic acid, drop by drop, until it has a very faint acid reaction. We cannot recommend you a better handbook than our first volume.

A NOVICE.—1. Spherical aberration may be much diminished, by the employment of a smaller stop in front of the lens. 2. Sensitive calotype paper will not, as a rule, keep good longer than twelve hours. 3 An ordinary magnifying glass in a frame, will be the cheapest substitute for a focussing eye-piece you can have.

Communications declined with thanks:—L. W. H.—Plymouth.—P. N.—Hyposulph.—Portrait.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Harry.—D. T.—Zylo.—T. P. O.—S. W. W.—Philosopher.—W. A. T.—D. R. L.—A. C. Q.—15.—Amateur.—O. F.—S. Johnstone.—Black Ink.

IN TYPE:—Sarnia.—Zingib.—Photos.—S. Highley.—J. W. Fall.—T. P. Barkas.—F. R. E.—A Benefited Reader of the "PHOTOGRAPHIC NEWS."—W. L.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 3d.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 32.—*April* 15, 1859.

A NEW METHOD OF PHOTOGRAPHY BY MEANS OF THE SOLVENTS OF CELLULOSE.

SUCH is the title given by M. Van Monkhoven to a memoir presented by him to the Académie des Sciences. It will be remembered that at page 39 of the present volume, we gave a detailed description of what had been done by Dr. Schweitser and M. Peligot in this matter, and we feel much pleasure in laying before our readers the principal facts which M. Van Monkhoven has obtained in the course of his researches into this subject, reserving the minor details to a future occasion.

The importance of finding a compound which, while it possessed all the advantages of collodion prepared in the ordinary manner, should possess the additional advantage of being *certain* in its results when prepared in a certain manner, will be readily recognised. At present, a photographer may adopt a particular formula for the preparation of collodion, and may obtain an excellent compound; he tries it again with the same care, and under precisely similar circumstances, and the result is a failure; to get it right he finds that he has to add a little more ether, or alcohol, or water. If, then, we find that the new substance gives a film which is in no respect inferior to the collodion now in use, and that it can be prepared with all the precision of a definite chemical compound, it is not difficult to foresee that it will gradually supersede the present uncertain preparation, at least so far as those photographers are concerned who prepare their own collodion; these are not, perhaps, a very numerous class.

M. Van Monkhoven says: "No sooner had I heard of the discovery by Dr. Schweitzer of the ammonio-cupric solvent of cellulose, than I commenced a series of researches with the view of discovering how far it might be rendered useful to photography; and after some weeks of assiduous research, I succeeded in finding a method both easy and cheap.

"The process which at first sight appears most rational, consists in dissolving in the ammonio-cupric solution of cellulose recently precipitated oxide of silver, pouring the liquid on a glass, allowing it to dry, and then submitting it to the action of diluted hydroiodic or hydrobromic acid. In this way there is, certainly, a white film of iodide or bromide of silver found; but all my endeavours to obtain a clear and transparent image were fruitless. Under the film of cellulose, a film of reduced silver was constantly formed, and the superficial image lost. I likewise used the ammoniacal deuto-bromide of copper, the compound ($2\,Cu\,Br.\,5\,N\,H_3$) and the ammoniacal iodide $2\,(NH_3).\,Cu\,I.\,3\,HO$, but in vain; a thin brown film of metallic silver was always formed under the picture. I mention this in order to spare persons the trouble of fruitless experiments.

"The methods I found to succeed perfectly were as follows:—

"The ammoniacal solution of deutoxide of copper was prepared either by saturating concentrated ammonia with freshly prepared oxide of copper (obtained by pouring a solution of caustic potash, in slight excess, on the commercial sulphate of copper, and well-washing the precipitate), or, better still, by following M. Peligot's method, which I advise photographers to adopt as being extremely easy. When the solid impurities are perfectly deposited, very white cotton should be dissolved in the liquid, in the proportion of 150 grains of cotton to a *litre* (rather less than a quart). A thick liquid is thus obtained, which can be diluted with a little water, that all the cotton may dissolve. A concentrated and standard solution of iodide of potassium is added, so as to ensure that each quart of the solution of oxide of cuprammonium shall contain from 75 to 150 grains of iodide. This liquid, which keeps perfectly well, is that which is poured on the glass.

"I must not fail to mention that it is on the ammonio-cupric solution that all the beauty of the photographic proof depends. It is necessary that the solution should be thick, flow slowly over the glass, and that the dry film should be perfectly transparent, without possessing in the slightest degree the appearance of ground glass. Let the solution be too weak, and the image will be superficial, without intensity, and may be washed away under a current of water. It is this fact, perhaps, which appears abnormal, that has prevented the earlier application of Dr. Schweitzer's discovery to photography.

"The ammoniacal solution is poured on the glass, and flows over it with considerable facility; and, as it evaporates very slowly, if a part of the glass is not covered, the liquid may be drawn over this part by means of the end of a tube. The excess of liquid is allowed to run off, and the glass is placed upright against the wall. At this point two methods of operation present themselves.

"1. The glass is left for a few minutes only to the influence of evaporation; the film becomes opaline, and the excess of liquid collects at the lower part of the glass; this is removed with a bit of blotting paper, and the plate is plunged in a bath of nitrate of silver, strengthened with acetic acid and recently precipitated acetate of silver. The film whitens, as in ordinary processes, by the formation of iodide of silver; it is then exposed in the camera, and the picture developed in the usual way.

"2. If, on the contrary, the glass be allowed to dry, the ammonia being totally eliminated by evaporation, the ordinary reaction of alkaline iodides on the salts of deutoxide of copper takes place; that is to say, protoiodide of copper ($Cu_2\,I$) is formed in the film of cellulose, and iodine on the surface. Such a glass is red when dry. Immersed in the nitrate of silver, it gives a superficial image which the slightest washing carries away, and more metallic silver is formed under the picture by the presence of the protoxide of copper. But I have endeavoured to find a remedy for these drawbacks, because this method will find numerous amateurs on account of its simplicity, and I have succeeded by passing the glass through absolute alcohol, in which a current of dry ammoniacal gas has been passed. The free iodine is converted into iodide of ammonia, and aldehyde is formed ($2\,I + 2\,NH_3 + C_4\,H_6\,O_2 = 2\,NH_4\,I + C_4\,H_4\,O_2$).

"A few seconds immersion suffices to whiten the glass. On removal from this bath it should be waved in the air, to insure the evaporation of the excess of ammonia, and then immersed, while still wet, in the nitrate of silver; the remainder of the manipulations being the same as usual. Pictures are obtained in this way of great delicacy, extreme transparency, and very suitable for the reproduction of views in which great delicacy and sharpness are necessary. I may observe, in passing, that, instead of ammoniacal alcohol, I employed distilled water, ammonia gas, &c., but the results were far from being as favourable.

"In conclusion, cellulose will evidently supersede gun-cotton in photography, the preparation of the latter for

photographic purposes being difficult, and subject to numerous accidents. The process I propose is of extreme simplicity, very economical, and it yields proofs of very great delicacy, at the same time that it is very rapid in its action, especially the first method."

THE NEW ACTION OF LIGHT.

BY M. NIÈPCE DE ST. VICTOR.

The following is the note referred to by our Paris correspondent, in his letter of the 5th inst., as about to be published in *Cosmos*:—

"To obtain the conviction that there is really an action of light when a sheet of sensitised paper is covered with a tube containing a piece of insolated cardboard, it is only necessary to make the following experiment:—Take a sheet of Bristol board and from it cut two pieces of equal size; put one of these pieces round the inside of a tube without insolation, and after insolating the other, line a precisely similar tube with it, and invert the two tubes over negatives (formed, say, of large printed letters) placed on the same sheet of sensitised paper, and leave them in a dark and cool place for twenty-four hours; after which time the sensitive paper must be dipped in gallic acid, and it will be seen which is the most vigorous image; if neither of the substances used has received the slightest influence from the action of the light, no image will be visible on that part of the paper which was covered with the tube containing the non-insolated cardboard.

"If the insolated cardboard had been properly impregnated with tartaric acid or a salt of uranium, the action of the light would have been all the stronger on the sensitised paper; but I must not omit to state that the solutions of tartaric acid and salt of uranium must not be too concentrated, because in this case crystallisation is produced on the paper which hinders the action of the light; also, that a too prolonged exposure to the light causes a diminution rather than an augmentation of activity; it in some way becomes weaker after attaining its maximum of intensity.

"I may observe, also, that the same result which I have pointed out as following on the inversion of the tubes for twenty-four hours may be obtained in ten minutes; to accomplish this, it is only necessary to slightly moisten the cardboard and heat it to a temperature of from 120 to 140 degrees, but not higher, for at 212 degrees, or even less, there is an action of heat which produces the same effect as light. But these two essentially distinct actions must not be confounded, although they may produce themselves simultaneously.

"In a word — the more the cardboard is impregnated with substance and insolated (without, however, exceeding certain limits), the more activity it acquires. Hitherto I have obtained the maximum of activity by means of tartaric acid.

"The nature of the size used for the paper or cardboard often suffices to make it acquire considerable activity.

"Now, if Mr. Crookes repeats his experiment of the cardboard impregnated with tartaric acid (non-insolated) without heating his tube, he will certainly not have any action; but if he operates comparatively with an insolated cardboard, he will have an impression which will be all the stronger as the operation shall have been continued a greater length of time; for the activity is very far from being totally liberated in twenty-four hours, if the operation be conducted dry and at a low temperature.

"Humidity, and a heat of from 120 to 140 degrees, speedily liberates this activity; but care must be taken to avoid raising the temperature to 212 degrees, because in this case there is an action of heat which acts chemically on certain papers sensitive to the action of light, and equally so to heat, as are all papers that are acid.

"For the rest, the best means of distinguishing the action of light is to take a paper insensible to heat, but remaining sensitive to light, as one prepared with an alkaline salt of silver."

PHONAUTOGRAPHY; OR, THE GRAPHIC FIXING OF THE VOICE.

We have already briefly referred to the curious essays of M. Leon Scott, and we believe it will be of interest to our readers if we allow the inventor, naturally enthusiastic, to develop the happy idea he has conceived at greater length.

"Sound, as well as light, gives a durable picture at a distance; the human voice being able to record itself, in the manner proper to acoustics, on a sensitivé surface; and after long efforts, I have been enabled to collect the tracings of all the movements of the air which constitute sounds, or noises; in fact, the same means have enabled me to obtain, under certain conditions, a faithful representation of rapid movements—of movements inappreciable to our senses from their smallness, and of molecular movements.

"It is a plan, as you see, by this new art, of forcing nature herself to constitute a written general language of all sounds.

"When the idea first occurred to me, more than four years ago, of fixing on a sensitive surface the trace of the movement of the air during singing or speaking, most of those to whom I confided my idea treated it as a chimera. The word did not appear to me to prove anything; it is the ordinary reception of the most sublime conquests of human intelligence, and my weak efforts have that in common with many great discoveries which in their cradle have been treated as utopian. I must admit, nevertheless, that this summary judgment was not without some appearance of reason. What is speech, in fact? A progressive movement of the air which surrounds us, induced by the play of our organs; but a very complex and infinitely delicate movement. This delicacy is such, that if you speak in a darkened room, in which only a single ray of sunshine is allowed to penetrate, the finest particles of dust in suspension, visible only in the luminous space, will not be agitated in a sensible degree. On the other hand, this subtile movement is exceedingly rapid. While one is speaking in an ordinary tone of voice, more than six hundred of these invisible movements of the air succeed each other in the short interval which intervenes between two strokes of the pulse, that is to say, a second.

"How, then, to succeed in fixing a clear, precise, complete trace of such a movement, incapable of agitating even one of our eyelashes? Ah! if I could only fix a pen or style on that air which surrounds one, and which receives all the elements of a sound, this pen, this style would form a trace on an appropriate fluid film. . . . . But where find a point of support? . . . To fix a pen on this fugitive, impalpable, invisible fluid, is a chimera, is impossible!

"This apparently insoluble problem is, however, solved somewhere. Let us attentively consider that marvel of marvels, the human ear. I say that our problem is solved in the phenomenon of hearing, and that the contrivances employed in the structure of the ear ought to lead us to the object sought. I don't just now pretend to make an incursion into the domains of the physiologist, but I must seek for what I require in the place where it is to be found. I have, besides, no necessity for any new theory on the organ of hearing, or on the manner in which it acts.

"This point found, the thing becomes one of rare simplicity. First of all, what do we see in the ear? A conduit. But what is a conduit? At the commencement of this century, on a calm night, M. Biot held a conversation in a low tone of voice, in whispers in fact, with another individual who was stationed at the other extremity of a tube made of brass, and which was 1,000 yards in length. Hence, in a conduit of any length whatever, properly isolated from all external movements, from all agitation of the strata of atmosphere,

the feeblest murmur of the voice is transmitted integrally to any distance. The conduit conducts, without alteration or diminution, the sonorous wave, complex as it may be, from one of the extremities to the other, by preserving it from all accidental causes which might disturb it; and if the conduit is in itself incapable of vibration, if no loss of the vibratory movement is accomplished on the journey, the wave will pursue indefinitely its primitive movement with the original purity, sharpness, and intensity. Such is, in acoustics, the part performed by a conduit in presence of a fluid in movement. I take note of this to obtain the autograph of sound at any distance. The conduit once found, I take possession of it and fashion it into a sort of funnel to concentrate the sounds towards its lesser extremity.

"Let us pursue our examination of the ear. At the end of the external auditory conduit, we encounter a thin membrane, tympanised and inclined. This membrane, according to the just definition of Müller, is a something half solid, half fluid; it partakes of the one by its coherence, of the other by the extreme facility of the displacement of all its molecules. It is the medium employed by nature for the transmission, as perfectly as possible, of the movement of a fluid to a solid. In the construction of the ear the divine artist has employed three membranes. We have just now seen that the sound of the voice does not sensibly agitate the dust suspended in space; yet we see that at a distance of more than ten yards, in a quiet room, during the night, the voice causes sand sprinkled on the surface of a membrane, stretched over a glass, to dance up and down energetically.

"We grasp now, in all its lucidity, the luminous thread which is to guide us; this support of our pen on the fluid in movement, which I asked for but a little while ago, is found; it is the thin membrane which we place at the extremity of our artificial auditory conduit.

"I have remarked that it was necessary, for the integral solution of the problem, that the style which was applied to fluid in motion, or, which comes to the same thing, on the membrane, should mark its trace on a second fluid. Indeed, any mode of inscription which should require an appreciable force would be impossible for our quasi aerial pen. It followed, therefore, that our sensitive surface must be fluid, in order that it might not offer any resistance to our delicate imprints. Well, just as we have taken a semi-solid for a pen, we shall take a semi-fluid for a matrix: this shall be lamp-black obtained from the smoke of burning bodies. A thin film deposited in a semi-fluid state, on any body whatever (metal, wood, paper, or tissue), and animated by an uniform movement of progression, in order that the traces formed shall not impinge the one on the other, such shall be our daguerrean plate, or rather our negative, capable of giving, by known means, thousands of proofs.

"You see the invention of the autography of sound and its fixation is, so to speak, consummated; it only remains to improve and extend the process, to apply it to science and the arts. I will not insist on the direct experiments which prove that all the elements of the voice pass by the membrane; that, with the requisite dispositions, its movement is adequate to that of the sonorous fluid. I will say nothing either of the form and dimensions of my artificial auditory conduit, of the preparation of the thin membrane, of the substance of the style and its mode of application; of the part performed by what is called the hammer. These are questions which are, without doubt, very important in the practice of this difficult art; but it would take too long to develop them here.

"I will hastily quote one or two facts in support of what I advance:—

"Every mass of air comprised within a limited space has, as is known, a proper tone, in which it resounds more easily and strongly than in any other. In a pipe it is this tone which is called the fundamental tone. Admit that this tone records itself in a manner distinct from all other tones—which is, in fact, the case—and there is a fixed unison found, a point of departure, without the intervention of the ear, for the accord between the instruments and the voices.

"I have observed that when it is a question of gathering sound at a certain distance, the conduit ought to be of a substance that will not vibrate. If it were sonorous, the vibrations of the membrane would become feeble; for at each transmission from a fluid to a solid they lose a considerable part of their amplitude. This circumstance of the vibration of the conduit caused by the voice, unfavourable to the autography of speech and song, furnishes us a means of recording the molecular movement of woods, metals, or alloys, under the influence of fixed and determined sounds; we might thus be able to acquire a knowledge of the mode of sonorousness of bodies in relation to their intimate texture. One of my plates yielded a notion *de visu* on the movement of a pipe made of ash wood under the influence of sounds and the voice. The style which wrote was placed directly on the wood instead of on the membrane. Each of the different materials employed in the arts, will give in this way a distinct *autograph*, the character of which will be subordinate to the disposition of its fibres, to its more or less perfect homogeneity, and its density. This opens the road, I hope, to some grand discoveries, as well as to useful applications to several manufactures.

"Phonautography reproduces not only the *tone* of the sound, it also represents in its way, the *pitch*.

"I have collected a certain number of proofs presenting the sounds of the voice compared with those of the cornet-à-piston, the hautboy, and of a large caoutchouc membrane, giving very grave sounds. The instruments, as might be imagined, distinguished themselves from the voice by the characters of the vibration. The traces of shouts or howling are clearly distinct from those of singing. I have been able to verify this curious fact, that the sound of an instrument, or a voice, gives a series of vibrations as much more regular and equal, and consequently more isochronous, as it is more pure to the ear, better heard; in the shriek, in the sharp sounds of instruments, the waves of condensation are irregular, unequal, non-isochronous. One might almost affirm that there are from this point of view, discordant sounds of an absolute form. Here is another aspect of the question of the *pitch*: it is a plate which shows the bad sounds of the voice—sounds that are not clear and sharp. With a little attention one may perceive, sometimes, two and even three secondary vibrations combined with the principal wave.

"The almost indefinite facility of separation of the molecules of the semi-fluid film will permit the extension of the investigations, and to obtain with ease the trace of the most subtle and delicate movements, other than the sonorous movements—the movements, for example, of the pendulum, of the magnetic needle, of the vibrations due to elasticity, or to torsion. As a specimen of this kind of study, the field of which appears to me sufficiently extensive, I show the trace of a movement singular in physics; that of a steel teetotum which slowly descends an inclined plane balancing itself on its axis. The number of its revolutions and the movement of libration are clearly marked. The attempts of producing the autographs of different explosions and quick noises, prove that it is easy to appreciate and measure, by this means, their succession, their character, and their relative intensities.

"Here is, then, a perfectly new graphic art which springs from physics, physiology, and mechanics. I shall, I hope, be excused from replying to the commonplace objection, '*What is the use of it?*'—always ready to salute a budding invention. It is, however, a question that I foresee, and to which I desire to respond with distinctness before I finish. Are you in a position, they will say to me, to give, without costly apparatus, without fresh essays, a natural stenograph, capable of immediate translation, of a speech? No. And this is the reason why the tracing of the words, which I possess at this moment, besides being incomplete, is but the analysis of the elements of the spoken voice; it is, to use an

expression of mathematicians, a function of the tone, intensity, and the pitch. It is not, then, a true synthesis of the word, nor, with greater reason, a purely conventional sign, like writing, which has, let us remember, no phenomenal reality. This synthesis, nevertheless, I believe possible, and I propose to attempt it. But great obscurity still weighs on the history of the articulated voice; when we know precisely what it is, after a complete study of each of its elements by our processes, we shall transform, by mechanical means, the tracing of the words into a succession of signs. I shall prefer, at this moment, to proceed from the simple to the compound, and to realise the stenography of singing and instruments, which will be easy, with a motive power of a uniform movement. I solicit the advice of men competent to assist me in preparing a more sensitive membrane, less hygroscopic, more approaching to the physiological membranes, than those used in commerce; for, as you are aware, commerce does not keep ready prepared the materials indispensable to unforeseen applications. I shall very willingly profit, also, by the suggestions of practical men as regards the question of reinforcement of the sound which presents itself, as a necessity, in the autography of spoken words.

"There are, I have no intention of concealing it, numerous precedents in the career on which I have entered. I could not, without too many digressions, trace a historical summary. I shall content myself with citing the names of Felix Savart, Jean Müller, MM. Duhamel, Arthur Morin, Pouillet, Wertheim, and Lissajous. Will these imperfect essays I have produced, procure my pardon for having dared to enter upon the ground trodden by such masters? I hope so, for I have already advanced much farther than they, perhaps, would have dared to prophesy."

We are happy to be able to announce that at this moment, M. Leon Scott, aided by the theoretical and practical ability of M. Rudolphe Kœnig, has just manufactured a new apparatus which registers with the greatest clearness the vibrations of a diapason even if they be of the number of a thousand a second. The registration on lines widely separated continues during twenty-four seconds; and the apparatus is in relation with one of M. Redier's chronometers, which divides this interval of twenty-four seconds into four intervals of six seconds each. We may, then, by a single experiment, count the number of vibrations of a given diapason, and make by simple tentatives that this number shall be rigorously equal to a given number: 870 for example. The problem of the diapasons and standard instruments, proposed by the Ministerial decision of the 1st of February, 1859, finds thus its easy and complete solution, and it seems to us impossible that this solution should not be immediately adopted.

We have also seen all the plates of which M. Scott speaks in his note—the tracery of simple sounds, compound sounds, chords of a prayer recited, a phrase declaimed, vibratory and gyratory movements of bodies animated, with, at the same time, a movement of transmission and rotation, &c., and we have found them truly surprising. We desired that they should be seen by Professor Wheatstone, who has himself done so much that is interesting in acoustics, and, like us, he found these essays of great promise for the future. He even undertook to bring the matter before the Royal Society of London. It is, therefore, with great confidence that we initiate our readers in the knowledge of this advance in the path of progress.

F. Moigno.

GOLD TONING PROCESS.

BY M. LE GRAY.

I have learnt that since the publication of my process of fixing positive proofs by chloride of lime and neutral chloride of gold, many persons have employed the process without obtaining as satisfactory results as those I obtained myself. This has arisen, I believe, in the first place, from want of habit, and experience of the force of the bath I have suggested, which, acting very energetically, does not allow of the action being followed without constant attention, and, consequently, it is very difficult to seize the exact moment when the proof ought to be withdrawn from the bath. By employing the following formula the progress of the operation will be much slower, and, consequently, more easy to follow:—

Distilled water	2,000 parts.
Chloride of lime	1 "
Chloride of gold	1 "
Chloride of sodium	1 "

The proof may remain in this bath for half an hour without detriment; the toning proceeding so slowly it is easy to arrest it at the moment it has acquired the desired depth.

I would observe that a bath of two litres, or quarts, containing only a very small proportion of chloride of gold, can only be efficacious in the case of about a score of proofs of the size of a quarter of a sheet; after toning them, it is advisable to restore the energy of the bath by adding a small quantity of the solution of chloride of gold, and a little pinch of chloride of lime. But, until the operator has gained considerable experience, it is better to prepare a new bath altogether after toning the number of proofs mentioned. The residues may be put aside, and the gold extracted by means of sulphate of iron. The permanency of a proof toned in this bath is very great, and its whites strikingly clear; the gold is deposited on the reduced silver which forms its blacks, at the same time that the coloured organic matter of the paper is restored to a white, by the well-known action of the chloride of lime.

One of the chief causes of its permanency, also, is the complete absence of free nitrate of silver in the fibres of the paper. In fact, when a sheet of paper containing free nitrate of silver is put in a hyposulphite of soda bath, this nitrate decomposes the bath by giving birth, in the substance and on the surface of the sheet, to sulphur, and to a sulphide of silver, which subsequent washings in water cannot remove from the proof, and which are an ultimate cause of change.

By submitting the proof to the action of the chloride of lime, previous to fixing, all the free nitrate is converted into chloride of silver, which, being completely soluble in hyposulphite of soda, can be entirely removed from the proof by a suitable exposure to its action; only, as the quantity of free nitrate of silver in the proof is somewhat conspicuous in reducing the chloride of lime bath to such a very weak proportion, it will be readily understood that after two or three proofs it would all be decomposed, and that, in consequence, I am obliged to add chloride to the bath, inert as regards the toning action; this is chloride of sodium, to furnish an element to the decomposition of the free nitrate of silver into chloride.

In comparing the proofs obtained by my process with those obtained by the old method, I must tell you that they were taken on paper prepared several days previously, and discoloured; in the old process this discoloration is evident, but in mine the tones are fresh, and the paper white. I would also observe that one great advantage of the new process is to enable it to be perceived directly it is dry, if the proof has been thoroughly deprived of its chloride of silver.

In cases where it remains in the fibres of the paper, this chloride will blacken immediately, and be rendered evident by transmitted light in the form of black spots.

To know, in a mathematical manner, the time it is necessary to leave the proof in the hyposulphite of soda bath for all the chloride to be removed, the following experiment must be employed:—

Put in two test tubes a like quantity of the hyposulphite of soda (500 parts of solution for example); then take one part of dried chloride of silver, and one part of iodide of silver, and these two products must be put, at the same moment, in each of the two tubes, and the exact time noted on a watch. The iodide requires a longer time to dissolve, the difference varying according to the temperature; the difference between the solubility must be noted. This known, a sheet of paper is prepared with the iodide of silver, with the same proportion of iodide by weight as the

chloride found in the same paper, prepared for the time of ordinary positive proofs. When this paper is dry it is placed in the hyposulphite of soda bath, the exact time being marked by a watch.

As the iodide of silver is yellow, the moment when it has entirely disappeared from the paper can easily be seen; and the exact time having been ascertained, the proportionate time to allow the corresponding chloride paper to remain in may be calculated from the first experiment.

It will be understood that this second experiment is necessary, for the confinement of the precipitates in the cells of the paper must necessarily change the soluble action of the hyposulphite of soda on the salts to be dissolved.

I give this method of ascertaining the exact time necessary for removing all the chloride of silver from a proof, because, when the exact moment is seized, the proof has a brilliancy and vigour which it cannot have when it has been exceeded. The other operations are the same as those described at page 253, vol. i., of the "PHOTOGRAPHIC NEWS."

COMPARATIVE EXPERIMENTS ON DRY PROCESSES.

BY W. L.

How invaluable, to many of your amateur readers, would be a faithful report of a committee of practical and *unprejudiced* photographers, on the comparative merits of the dry preservative processes, which for the last few months, amidst conflicting statements, have been striving for supremacy.

This expression has, to my certain knowledge, echoed its utterance from every nook of the country where the camera has found its way, and indicates a desideratum which, no doubt, many of your readers could supply.

Allow me, then, by one or two observations on an article of great interest, by Mr. Draffin, contained in your publication of the 8th inst., to endeavour to contribute a few facts resulting from my own experiments, undertaken to ascertain the value of Fothergill's process compared with Taupenot's and Dr. Hill Norriss's. With each of these processes I have worked largely and successfully, and can fully appreciate their value. But my decided preference is accorded to the former, for I have found it fully equal to the latter in keeping qualities, and in sensibility *considerably superior* to either. Now this conclusion, your readers will perceive, is directly at variance with Mr. Draffin's conclusions in the second sentence of his communication.

Which of these conflicting statements, then, is to be credited? I have as little doubt of your correspondent's veracity, as I have of my own.

Both of us, unquestionably, are stating what, by ocular demonstration, we can prove to others and to *each other* as a *fact*—and "facts are stubborn things" from whatever point of view we examine them.

Here lies the solution of the difficulty—in this direction must we seek for an explanation of the discrepancy, viz., the *extent of the washing on the removal of the plate from the bath*, *i.e.*, the amount of the free nitrate of silver left on the plate when the albumen was poured on. I insist on this point the more especially, because, although the character of the collodion, and the strength of the silver bath, of course, affect the sensibility of the plate, I assume that your correspondent employed in his *comparative* experiments the same collodion, and *did not excite the Fothergill plates in the acidulated Taupenot bath.*

When I tried my first experiments with the process in question, I followed the directions of its discoverer as contained in its announcement in the *Times*—which were *indefinite*, and therefore *defective*. We were told simply to *wash the plate*. My conclusion, therefore, was, that the object of the washing, as in other dry processes, was to rid the sensitised film of the free nitrate, instead of leaving sufficient imprisoned amidst the molecules of the collodion to form the albuminate of silver (with probably a slight excess of silver), which constitutes the peculiar and valuable feature of this process. From this cause, the first plates I prepared required about double the exposure of the collodio-albumen, and even then the impression was faint and worthless.

If your correspondent would employ a non-contractile collodion (which, although by no means essential, is, I think, preferable)—excite his plate in an *ordinary negative* bath—drain closely on its removal; then immerse it in a second nitrate bath, containing two grains of silver to the ounce, raising it up and down until all appearance of greasiness is removed; and then dose it, after draining for a minute and a half, with albumen, as generally directed by the advocates of this process, I apprehend he will see reason to change his opinion of its "utter uselessness for taking interiors."

I cannot absolutely say that I have taken *better* pictures by this process than by either Taupenot's or Dr. Norriss's, for I can conceive *nothing to be wanting in a picture obtained by either the collodio-albumenised or gelatinised plates when well manipulated;* but, in my hands, this process exhibits greater sensitiveness than the latter, in the proportion of a minute and a half to two minutes.

Should your correspondent, Mr. Draffin, wish to communicate with me, or to inquire into any particulars which he may conceive to be omitted in this article you have my full permission to hand him my address.

SACCHARO-SULPHATE OF THE PROTOXIDE OF IRON AS A DEVELOPING AGENT.

BY MR. HUGH ROBERT RUMP.

HAVING, in common with all photographers, experienced the great difficulty, if not impossibility, of preserving the protosulphate of iron from further oxidation, and thus losing its value as a reducing agent, I was induced some time since to make trial of the saccharo-protosulphate of the same metal, and, I may add, with the best results. The saccharo-sulphate of the protoxide of iron crystallises in most splendid pale green rhombic prisms, in stoppered bottles remains unaltered for many months, and is readily soluble in water, the solution keeping unoxidised for a considerable time. These properties render it an admirable substitute for the common protosulphate. It answers equally well for a negative or a positive developer, and, I fancy, has less tendency to stain or fog the plate than the old protosulphate; at the same time producing a denser and more vigorous picture.

Lessons on Colouring Photographs.

ALBUMENISED PAPER.

FOR this purpose we prefer the so-called "Photographic Water Colours," made by different colour manufacturers. Those are best which contain rather more gum than usual, which, of course, renders them more transparent, and consequently more suitable for this purpose.

Sable brushes will be found to work best, always observing, that the larger the brush you can manage to manipulate with, the freer will be the work.

There is an article also sold by the colour makers, called "Water Colour Medium," which will be found capable of preserving transparency throughout a picture, and especially in the shadows. In the absence of this, however, make a gum to work with of quarter-ounce gum arabic, teaspoonful of whisky, lump sugar about size of a filbert, and two ounces hot water; when dissolved, filter through muslin (the greatest cleanliness being necessary), and it is then ready for use.

The only other material to be mentioned is, the "burnisher," an instrument consisting of an agate, set in a

mahogany handle, to enable the hand to grasp it firmly; the best form for which is the following.

The use and purpose of this instrument is to render the surface of the photograph hard and smooth, by rubbing on the back of the picture, with great pressure, whilst the front is laid upon a flat piece of *thick plate glass*, and, without which, no artist can make his picture look anything but rough.

It is strange that, in most works at present published on this subject, the burnisher and glass plate are omitted, and no reference made thereto, when they are used by every photographic colorist upon paper, of any note, in London, and cannot be dispensed with; in fact, it would be impossible to work well upon paper unless the surface were constantly kept hard and smooth.

A photograph, in printing and toning, may be made of different colours; that most convenient for painting is something between a cool grey and bright chocolate, inclining to the former—having the highest lights upon the flesh, as nearly white as possible—minding not to have any creases or cracks in it, as then the colour would run in, making a palpable line.

You will also require a copy something darker, to be used as a guide during the progress of the picture, that you may not depart too much from the likeness.

COLOURS AND THEIR COMBINATIONS.

In the following we have only named such colours as will be most frequently mentioned in the course of this work.

White.—Chinese white is unchangeable, being the oxide of zinc, but, being slightly transparent, is not so good for giving bright points as permanent white.

Crimson lake.—A generally useful colour—the most transparent red known; entering kindly into all tints connected with purple, lilac, &c. Crimson lake, thinned with water, makes pink as well as any colour.

Vermilion.—Chinese vermilion is brightest. This colour, with lake in half tints, is good for military coats, &c.

Carmine.—The purest, brightest, and most intense crimson known; may be deepened by glazing with lake.

Indian yellow is the brightest transparent yellow we possess, therefore most necessary in painting photographs; it also, with Roman ochre, represents gold, slightly washed on, well enough for tinted pictures.

Chrome.—There are several degrees of chrome. They are useful as body colours in painting the light parts of yellow drapery in gold lace, &c.

Gall stone.—A strong yellow—transparent—suitable for sallow complexions, such as many old people's, whose colour is principally made up of warm yellow in the lights, and purply greys; also useful for glazing draperies, which, in good photographs, want nothing more than a transparent wash.

King's yellow.—Used for bright light touches on gold, &c.

Burnt sienna.—Very rich yellow brown, inclining to red, used, with lake, in the carnations of warm complexions.

Raw sienna.—A rich transparent yellow, useful, with lake or vermilion, to warm up the flesh tints.

Prussian blue.—The deepest, most transparent blue known.

Antwerp blue.—A delicate transparent blue, used in flesh greys.

French blue.—A bright opaque blue, equal in effect almost to ultramarine by day, but looks black by gaslight.

Cobalt.—A light bright opaque blue, used with lake in almost every pearly grey tint throughout a head.

Indigo is a deep grey blue, more suitable for backgrounds.

Ultramarine.—Extremely brilliant opaque, useful for the lights in blue silks, satins, &c.; too heavy for flesh.

Ivory black.—Used with white for the lights in black cloth.

Lamp black.—With lake, for intense shadows in cloth.

Neutral tint.—A purply slaty colour—dark grey—used for deepening cool backgrounds, semi-transparent.

Vandyke brown.—A fine chaste brown used for backgrounds.

Madder brown.—Useful for deepening the shadows of flesh.

A brown of general application is to be made of burnt sienna and black; may be varied and made either warmer with more sienna, or cooler with more black.

Sap green is suitable for painting backgrounds of an olive colour; which it represents added to pan brown in various degrees.

Emerald green—an opaque bright colour—may be used as a body colour for the lights of silk and jewels, to be glazed over with a transparent green made of Prussian blue and raw sienna, when a rich effect is produced.

Purple is made of blue and crimson lake; the royal purple being nearly all lake.

Orange.—Crimson lake and Indian yellow.

(To be continued.)

Dictionary of Photography.

Caseine.—The curd or coagulable portion of milk. It has been proposed to be used in photography, and several papers on the subject will be found in our first volume. It may be prepared as follows:—Take white cheese and heat it with a solution of carbonate of soda in such a way that after a contact of several hours there shall be a little cheese in excess. Filter, and pour into the solution some lime water, when there will be produced an abundant precipitate consisting of almost pure caseate of lime. Filter through a cloth, well wash, and allow to dry spontaneously. When caseine is required, take a small quantity of this caseate of lime and add it to dilute hydrochloric acid in such proportions that a little of the salt shall remain undissolved; filter, and wash the precipitated caseine with care. It will be found convenient to preserve it in the form of caseate of lime, and only convert this into caseine in small quantities as required for use, as the body itself soon putrifies.

Catalysotype.—A name given by Dr. Woods to a process discovered by him. Paper is first prepared with syrup of iodide of iron, and then, when dry, with nitrate of silver. After exposure in the camera, the picture gradually developes itself. The process is of interest owing to the curious phenomenon which it presents of the picture gradually developing itself; but it has not been hitherto much employed in practice.

Catalysis.—This term was proposed by Berzelius to be applied to that modification of the force of chemical affinity, by virtue of which, he says:—"Certain bodies exert by their contact with others such an influence upon these bodies that chemical action is excited, compounds are destroyed, or new ones formed, although the substance by which these actions are induced does not take the slightest part in these changes." The whole doctrine of catalysis, or *action by contact*, is, however, involved in great obscurity, and it is not at all improbable that the peculiar effects ascribed to it may eventually be explained without having recourse to the theory of a new force. The immediate decomposition of gallo-nitrate of silver, if placed in a dirty vessel, while the same mixture would keep for hours in a clean vessel, is a familiar illustration of catalysis; the impurities on the surface of the dirty vessel exert a *catalytic action* on the gallo-nitrate in contact with it, and the whole rapidly decomposes.

Caustic.—In chemistry a body that exercises a corroding or solvent action on substances, principally the skin, is called by this name—thus, strong sulphuric acid, potassa, and nitrate of silver are said to possess caustic properties. The term is also usually applied to signify an alkali or alkaline earth uncombined with carbonic or other acid, *e.g.*, caustic potassa, caustic baryta, &c. *Lunar Caustic* is the old name for nitrate of silver, when fused and cast into sticks for surgical use.

CENTIGRADE—having a hundred degrees. The term *centigrade scale* is usually applied to the continental methods of graduating thermometers, in which the number of degrees between the freezing and boiling points of water is divided into 100 degrees—the boiling point being 100°, and the freezing point 0°. The following table, of similar temperatures, on both the centigrade and Fahrenheit scales, will be found useful. They are taken at every fifth degree on the centigrade scale in order to avoid fractions :—

Cent.		Fahr.	Cent.		Fahr.	Cent.		Fahr.
0	equal to	32	35	equal to	95	70	equal to	158
5	"	41	40	"	104	75	"	167
10	"	50	45	"	113	80	"	176
15	"	59	50	"	122	85	"	185
20	"	68	55	"	131	90	"	194
25	"	77	60	"	140	95	"	203
30	"	86	65	"	149	100	"	212

The centigrade scale is generally used in France, and very frequently in England, especially in scientific researches.

CENTIMETRE.—A French measure of length, equal to 0.394 inches; 10 centimetres, therefore, are nearly equal to 4 inches, and 100 centimetres, or 1 metre, are equal to about 39½ inches. The *cubic centimetre* is frequently employed as a measure of capacity; it is equal to 17 minims; 100 cubic centimetres about equal 3½ fluid ounces; and 1,000 cubic centimetres, or 1 *litre*, equals 35¼ fluid ounces.

(To be continued.)

A Catechism of Photography.

NEGATIVE PROCESS OF PRINTING.

Q. May not positive photographs be obtained by a negative process?

A. They may, and with very good effect.

Q. When is the negative process most useful?

A. In the dull winter months, as the chemical action of the light on the chloride of silver is then a very slow and tedious process.

Q. How is the negative process conducted?

A. By exposing for a short time the sensitive paper under a negative photograph to the action of light, and by developing by a subsequent process the latent image thus obtained.

Q. What is the best method of preparing the iodised paper for the latent image?

A. A very good iodised paper may be thus prepared: make the following solution :—

Iodide of potassium	10 grains.
Water	1 ounce.

Float the paper on the solution, and dry in the usual way. Sensitise the paper in a bath of—

Nitrate of silver	20 grains.
Glacial acetic acid	30 minims.
Distilled water	1 ounce.

Three minutes' contact with this solution will be amply sufficient.

Q. How is the paper so prepared to be used?

A. By placing it in contact with the negative in the printing frame, and by exposing it to the action of light.

Q. How long should the paper be exposed to the action of light?

A. For a few seconds; half a minute is generally sufficient, but this depends on the intensity of the light. The exposure has lasted long enough when a change is observed to take place in the colour of the margin of the prepared paper.

Q. How is the image developed?

A. By means of a saturated solution of gallic acid rapidly brushed over the surface.

Q. Is the process always conducted in the same way?

A. Certainly not; several plans have been suggested and are adopted by different photographers with more or less success. M. Vigier, Le Gray, Nièpce de St. Victor, in France, Sir W. Newton, and many others in England, have directed their attention to this process, and in some particulars their formulæ differ.

Q. Describe the process of M. Vigier?

A. The iodised paper is prepared in a solution composed of nitrate of silver in distilled water, and iodide of potassium in distilled water, mixed together, and the precipitate dissolved in an excess of the iodide of potassium. After receiving a coating of this compound solution, the papers are immersed in clear water for twelve or sometimes twenty-four hours; they are then dried, and the surface so prepared presents a slight yellow tint, very pale in colour, but equal in all parts. The papers are sensitised in a solution of—

Distilled water	250 parts.
Aceto-nitrate of silver	5 parts.

The aceto-nitrate of silver is thus prepared :—

Nitrate of silver	10 parts.
Acetic acid	20 parts.
Distilled water	100 parts.

The papers are floated on the surface of the bath for two or three minutes; they are then partially dried on blotting paper and exposed, as before stated, to the action of light in the printing frame. The latent image is developed by a saturated solution of gallic acid, to which is added a few drops of aceto-nitrate of silver; this solution being placed in a basin, the paper is floated on its surface, and the image, when sufficiently developed, is washed first in a bath of hypo. sulphite of soda, and afterwards in a bath of clear water. Pictures so obtained are generally very effective.

Q. Describe M. Le Gray's process?

A. His process consists in making the paper float on a solution of—

Rice water	1000 parts.
Sugar of milk	45 parts.
Iodide of ammonium	20 parts.

It is sensitised in a bath of aceto-nitrate of silver, immediately dried between leaves of blotting paper, and exposed in the printing frame under the negative. The image is developed by a saturated solution of gallic acid, and when all the details are visible, a red or black tone is given to the proof by the application of aceto-nitrate of silver. It is washed in a solution of hyposulphite of soda, containing a very small portion of chloride of gold.

Q. Describe M. Nièpce de St. Victor's process?

A. The paper employed in this process is not submitted to any previous preparation; it retains its chemical activity for several days, but must be used with great care. The paper is floated on a bath of nitrate of uranium composed of—

Nitrate of uranium	20 parts.
Water	100 parts.

After some minutes, it is taken from the bath and dried in a dark room. The paper is then laid aside for future use. For printing, the paper, prepared as already stated, is placed under the negatives and exposed to the light for ten minutes or a quarter of an hour. The latent image thus obtained is developed first in a bath of nitrate of silver, in which the image rapidly appears; that is to say, it is fully developed in thirty or forty seconds. The paper is then washed in several successive baths of pure water, and is fixed in a bath of chloride of gold. A bath of bi-chloride of mercury will answer the same purpose, but when this is employed it is necessary that the paper should be exposed for a much longer period to the action of light, during the printing process.

Q. Describe Sir W. Newton's process.

A. In this process bromide of potassium or calcium is used in place of the ordinary iodide of potassium, as it is said to yield a better tint, and to give greater purity to the white parts of the picture. Take of

Bromide of calcium	10 grains.
Gallic acid	5 grains.
Water	10 ounces.

A small piece of camphor should be soaked in the water for twelve hours to obtain a saturated solution; then add two or three lumps of white sugar, the gallic acid, and the bromide as already stated. The solution should be applied by brushing it over the paper. The exciting bath is composed of nitrate of silver, glacial acetic acid, and distilled water; it also is applied by the use of a brush. Immersion in gallic acid develops the latent image.

Q. Describe another process.

A. The paper in this process is prepared with serum of milk, with or without bromide of potassium. The papers are immersed in the bath. In the sensitising process they are also immersed, and the development is conducted by immersion in a solution of gallic acid. In the preparation of the serum of milk, it is advised to separate the caseine by rennet (previously washed to remove salt), in preference to using acetic acid.

Q. Are pictures taken by this negative process equal to those taken by the ordinary method?

A. Many of them are exceedingly good, but the amateur is advised to master the manipulation of the ordinary positive process before experimenting on that by development.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, April 11, 1859.

M. Niècpe de St. Victor presents this day to the Académie des Sciences another paper on the new action of light. The principal fact contained in this new communication is an experiment made in an ice-house. Having taken an iron tube he lined it with cardboard impregnated with tartaric acid, which had been already insolated, as in his previous experiments. This tube was then buried in ice for forty-eight hours, after which it was opened and its orifice applied to a photographic paper prepared simply with nitrate of silver and dried. A thin piece of printed paper was interposed between the tube and the sensitive paper to serve as a negative. The contact was continued for forty-eight hours, after which the sensitive paper was passed into a solution of gallic acid, when an image was immediately developed.

If the photographic paper had been prepared with iodide of silver, this image would have been stronger; but such as it is, it is sufficient to prove the possibility of obtaining images by this new action of light without the aid of any calorific radiation.

Messrs. Davanne and Bayard have repeated the curious experiment made by Mr. Young, in which it is proved that a photographic image can be *developed* on albumen or albumenised collodion in open day-light, and by the ordinary means, provided care has been taken previously to *fix* the image in the dark by means of a solution of hyposulphite of soda, which dissolves and removes all the iodide of silver. Their experiments confirm completely all that was stated by Mr. Young; and M. Davanne thinks he has now completely under his thumb a satisfactory theory of photography. "Reflecting," says he, "upon the chemical reactions that must take place in Mr. Young's experiment, I find in it a confirmation of the recognised photographic theory. . . As concerns negatives, the theory may be stated thus:—1st. Reduction by light of a very slight quantity of silver-salt to the metallic state; 2nd. Development of the image by a series of deposits of new atoms of silver furnished by the reducing bath and fixed by molecular attraction." We must leave it to our readers to estimate the value of this theory.

The exhibition organised by the *Société Française de Photographie* will be opened on the 15th of this month in the south-eastern pavilion of the *Palais de l'Industrie.*

M. Pouchet, whom we named in our last letter, has lately endeavoured to determine, by experiment, whether the atmosphere is really overloaded with minute, invisible eggs of infusoria and microscopic vegetables, as is generally admitted in the scientific world, and to which circumstance is attributed the spontaneous apparition of inferior animal and vegetable forms on decaying food, in stagnant water, &c. M. Pouchet's experiments have proved that it is almost absolutely impossible to discover any living germs in the atmosphere. The corpuscules this distinguished microscopist has recognised suspended in the atmosphere consist of *debris* of rocks, silica, minute fragments of vegetable matter, fæcula or starch, dead animalculæ in a complete state of desiccation, siliceous shells of diatomaceæ, &c., &c. But no eggs of infusoria, of algæ, of diatomaceæ, &c., were to be found. One of the simplest forms of these experiments consists in passing 100 pints of atmospheric air through a small quantity of pure water, and after leaving the water for a week, to examine it at the expiration of that time under the microscope; no animalculæ are to be seen in it. As dust is nothing more than a deposit formed by corpuscules that have floated in the air, M. Pouchet, to complete his observations, has examined dust deposited in France, in Italy, in Egypt, &c., but his search after living germs of animalculæ was not more successful.

In more than *one thousand* observations of this kind he only *twice* met with eggs of a large species of infusoria.

How then shall we account for this simple experiment? —In a cubic inch of pure distilled water, five grammes of any fermentescible substance is placed, and the whole covered with a glass bell, the capacity of which does not exceed one pint. This apparatus is kept at a temperature of 18° (centigrade) for one week, and at the end of that time the surface of the water is covered with myriads of animalculæ!

Sig. L. Cavanna describes, in the last number of the *Annali de Chymica* published at Milan, a novel method of obtaining pure crystallised silver: a certain quantity of any kind of silver is dissolved in nitric acid, and the solution is filtered if gold is present. This solution must be evaporated to dryness in a porcelain capsule to eliminate the excess of acid. The nitrate of silver is then taken up with distilled water and evaporated again as much as possible, without, however, allowing a deposit of crystals of nitrate. When the liquid is thus concentrated as much as possible, it is poured into a cylindrical vessel of glass, and pure distilled water is poured into it, taking care that the water and the salts mix together as little as possible; or, so that the distilled water form a layer above the solution of nitrate. One or more silver wires are then immerged very quietly into the solution, and the apparatus is gently placed in a water-bath, heated to 50° or 60° (centigrade), and left in complete repose. In about six hours it will be seen that a quantity of crystal of silver has formed on the lower part of the wires. These crystals adhere very feebly to the wires, they are separated, washed in water, then in hydrochloric or sulphuric acid, and then again in water, when they may be considered as pure silver. The author says nothing of the *form* of these crystals. The remaining solution can be concentrated anew, and will then furnish another supply of crystals, and so on, until no more silver remains in solution.

M. Silbermann has just presented to the *Société d'Encouragement* of Paris, a report of a new gas-burner invented by M. Monier. This burner is possessed of a double current of air; its characteristics consist in the interior envelop of the annular chamber being of porcelain; the burner is of pipe-clay; the chimney, cylindrical for two-thirds of its height, has the other one-third in form of a truncated cone, terminating in an orifice, the diameter of which is only half that of the cylindrical part. The chimney, the glass globe, and the lower part of the lamp (the basket), are all joined in one piece of glass, pierced here and there to admit air. The burner, which is of pipe-clay, is pierced with thirty holes. Its value is one half-

penny, and it becomes harder and harder by use. This apparatus has been impartially compared with many others in its effects, and it has been finally decided that the gas-burner of M. Monier, whilst giving the same amount of light as that given by any other system, shows an economy of about one-third in the quantity of gas consumed.

Dr. Almagran, it appears, has discovered, at last, a substance that may probably in many cases be substituted for quinine or sulphate of quinine in the treatment of fevers. The newly proposed febrifuge is *ferrocyanuret of soda and salicine*; it contains, therefore, a bitter tonic, salicine, an alkali (soda), and nitrogen, qualities which are found united in quinine. It can be administered without danger in considerable doses (49 centigrammes, or about 10 grains). That it is really absorbed by the animal economy is proved by its being afterwards found in the urine.

This new medicine deserves to be experimented in England, since it appears to have met with much success abroad, and especially as used by Dr. Renucci, in Algiers.

In France a new plant, *Statice tartarica*, has been lately brought forward by MM. Masson and Payen, as a substitute for oak-bark in tanning skins. According to M. Payen's analysis the root of this plant contains three times and a half as much tannic acid as is found to be contained in a medium quantity of oak-bark. *Statice tartarica* grows largely in Russia, where, we are told, it has been employed in the preparation of leather.

M. Wöhler, professor of chemistry in the University of Göttingen, has just made the analysis of a meteoric stone which fell at Kaba, in Hungary, on the 15th April, 1857. This aërolite is black, and its colour was found to be owing to coal. Besides those elements generally found in meteorites (iron, nickel, silicates, &c.), it contains a certain quantity of organic matter, a carburetted hydrogen, very similar to paraffine. M. Wöhler has also found this same organic matter in the meteoric stone which fell in 1838, at the Cape of Good Hope. The colour of this stone is also black, and it contains 1.5 per cent. of carbon. This is the first time that organic matter has ever been discovered in those mysterious visitants commonly known as "falling stars."

An important election is taking place to-day at the Academy of Sciences here, to fill the vacancy left among the correspondents of the institute by the death of the distinguished chemist Gerhardt, of Montpellier.

The candidates presented are:—On the first rank, Professor Hofmann, of London; on the second, and alphabetically, M. Piria, of Turin, and M. Schrœtter of Vienna. We have not much doubt that Dr. Hofmann will carry all before him.

P.S., *April* 12.—I open this letter again to add that yesterday evening Dr. Hofmann was elected corresponding member of the institute by 40 votes, against 2 votes given for M. Piria, and 1 to M. Schrœtter.

PHOTOGRAPHY IN ALGERIA.*

You photographers, "who live at home at ease," have no notion of the sensation of comfort, of intense *bien être*, which one feels on finding oneself, after a day's hard exercise in the open air, before a blazing fire, in a picturesque situation, with a cup of hot coffee at the right hand, and a pipe filled with the fragrant weed in the left. No matter what the fatigues of the day have been, they are all forgotten then, and the present seems so delightful that one forgets to think of the future. For my part, having nobody to speak to of friends at home, I don't often suffer myself to think of them, as to do so would cause me more pain than pleasure, as I not unfrequently experience when I wake up from a dream of bright eyes and musical voices, and find myself among fellows whose voices sound more like the filing of the teeth of a big saw than anything else. At such times the feeling of nostalgia is so strong that I cannot recover myself for some time. However, I must dismiss this from my mind, and return to the subject where I started from it. After smoking had been continued for some minutes, one of the Arabs called upon the recognised story-teller of the party for a tale, and when this was finished, another succeeded it, generally a love tale, the peculiar beauties of the fair one being described in far more minute detail than is usual even in the most sentimental of English novels, or a tale of a lion, which, I must confess, interests me far more than the love tales. I remember that, on this particular night, one was told of a much more horrible character than any I had heard previously; and, as Hamed assured me, was undoubtedly true in its principal facts, though possibly not in all its details. It ran very much as follows:—

. . . .

After listening to these and similar narratives, which, perhaps, interested me more than they will you, from my having heard them by the light of a blazing fire, surrounded by a belt of trees barely visible on the edge of the black darkness behind them, until I was tired, I lay down with my head and shoulders inside my tent and my feet projecting towards the fire, and was soon sound asleep. I don't know at all how long I had been so before I was roused by something, and felt a pain in my head, and directly afterwards I received a blow on the head through the side of the tent, which made me think for a moment that I had been struck by an iron bar with claws at the end which I carried with me in my waggon; but in an instant the idea flashed across my mind that it was a lion which was sniffing at me through the back of the tent. To have called out would probably have led to his tearing down the slight barrier between us, and in that case your correspondent would, probably, by this time have been, to a certain extent, converted into a lion, and be wandering about among the mountains in search of an ox, or some little trifle of that sort, for his evening meal; and I should have been deprived of the advantage and you of the pleasure of seeing my negatives in England; fortunately, however, though a cold perspiration burst out on every part of my body, I merely withdrew my head quietly from the side of the tent, and stretched out my hand in search of Hamed, but without finding him. I hardly knew what to do. If I remained where I was without moving, there was the probability of the beast tearing up the tent and dragging me through. On the other hand, an attempt to move closer to the fire would probably be detected, and the lion has the same characteristics as the cat, and would doubtless have sprung upon me in that case, and have carried me off. While hesitating what to do, the animal, most likely from not being able any longer to feel anything through the wall of the tent, must have turned away, for after what was in fact but a few moments, but which seemed a very long time, there was a terrific shriek, followed by a low, deep growling, then a shot, and a louder growl. I felt about for my revolver, which I had placed beside my head before going to sleep, and creeping round the tent I saw the horrid beast standing perfectly still, with glaring eyes, and continuing the same low, deep growling, and holding in his mouth the body of a man, which he occasionally lowered on the ground as if with the intention of taking a firmer hold, but never entirely letting go of it. I saw by the direction of his look that he had caught sight of me, and so terrible are the associations connected with the beast in my mind that I dared not move or breathe for some seconds, when the thought suddenly occurred to me that it must be the body of Hamed that he held in his mouth. My liking for this man had become so strong that the desire to rescue or avenge him drove every feeling of fear out of my mind, and, with a steady aim, I fired at his body just behind the shoulder. Singularly enough, although I knew I had hit him, he merely gave a loud growl and remained stationary, without relaxing his hold of the Arab's body. How long he would have remained in this state of immobility I can't say, but I was just about to try the effect

* Continued from vol. ii. p. 56.

of a second shot, when a regular volley of guns was fired from out the darkness; the beast sprang forward towards me, almost at the same instant that I felt a sharp, stinging sensation in the upper part of my arm, and fell to the ground so close to me that I stepped back to avoid a blow from his paws in his death-struggles. They did not last long, and as soon as they were over I fetched a lighted brand from the fire, and first holding it to the face of the dead man to see who it was, and feeling much relieved at finding it was not Hamed, I waved it about as a signal for the others, that they might come with safety. They soon came and clustered round the body of the dead lion, some kicking it, and others spitting on and reviling it, and all of them claiming the honour of having killed him, a claim that they seemed far more interested in defending than in commiserating the fate of their dead companion. All the efforts we made to release the latter unfortunate from the jaws of the lion were unavailing without having recourse to our knives, and as there was not the least doubt of his being dead, for the teeth of the powerful brute were buried in his chest and back, we determined on leaving both bodies where they were until daylight.

The first thing I did when I awoke was to look for the bodies of the Arab and the lion. They were lying where the beast had fallen in the night, and his stiffened jaws still held the body of the man as in a powerful vice. The desire of preserving a record of the event for my friends in England to look at was too strong to be resisted, so we set to work; cut three pieces of timber to a point, and, having raised the lion to an upright position, kept him up by means of the pieces of wood. To conceal these, I planted a shrub here and there, which had the desired effect; and the result I obtained was a negative, the like of which, I believe, never was seen. The attitude is as natural as possible, and makes one shudder to look at it.

After the operation of taking this picture was concluded, I thought I might as well take another of the scene of the occurrence, but a glance at the number of plates I had with me induced me to refrain, as I feared that, if I did so, I might be prevented from taking a picture of more interest on a future occasion. Indeed, I find my stock of collodion getting low, and as to buying or making any before returning to Algiers, that is out of the question.

After our morning meal was finished, and my apparatus repacked, we started in search of game; we were not particular as to the kind, our chief object being to find an occupation which should give us sufficient excitement to prevent the time from hanging heavily on our hands. Your readers will, perhaps, be surprised to learn that the great amusement of the upper classes in England many years ago, hawking, is still practised by the Arabs. Great pains is taken in training those birds for the sport, and a good deal of barbarity is exercised on the animals which are employed for the purpose of teaching. Two of our party carried hawks, and soon after we had started from our camping place an opportunity was given to one of them to try his prowess on a hare. The animal was feeding on the border of an extensive plateau, and on our emerging from among the trees immediately behind her, she started off at speed across the open. The Arab threw off his hawk as quickly as possible, with the exclamation—"In the name of Allah!" a phrase intended to sanctify the game, which otherwise would not be lawful food, in consequence of its not being killed in the orthodox manner. The bird rose up in the air to a great height, while we went galloping along after the hare at coursing speed, but gradually losing ground, in consequence of the bushes that were sprinkled about; and, for my own part, I was too much engaged in looking after the hawk to mind where I was going, and if my horse had rolled over, as he was very near doing more than once, it is possible that it would have deprived you of this letter. Suddenly, I observed that the hawk, which had reached a height where he appeared to me to be stationary, began to descend with tremendous velocity, and, almost before I could pull my horse up to get a steadier view of what took place, came right upon the hare like a thunderbolt, the animal rolling over and over like a ball, in consequence of the speed at which it was running when it received the blow. On my reaching the spot the hare showed no signs of life, although the bird was busily engaged in tearing out its eyes.

All this has not much to do with photography, has it? Yet, if any photographers come out here this summer—and no doubt they will—they will not be likely to find anything more interesting to write about; for I conceive that your readers would not care to read how I sometimes find that the negative is deficient in sharpness; how I sometimes find that I have exposed too long, and at others too short a time, though the actual length of the exposure has been precisely the same, and the circumstances under which the exposure took place, identical; followed by ingenious speculations as to the cause or causes, all more or less wide of the truth. All this might be both interesting and perhaps useful, if I were in England, but would be of no sort of use writing from this country. As to the real difficulties under which any of my brethren in the art would labour, in the same situation in which I am placed, I feel that their native ingenuity would enable them to get over them in the same way that I do, viz., by adopting an expedient suitable to the occasion.

C. A.

Miscellaneous.

Discoloured Chloride of Silver.—M. Cavalier has obtained chloride of silver in a similar dark state to that which has been exposed to the light, by dissolving recently precipitated chloride of silver in ammonia, and passing chlorine into the solution. The usual decomposition of the ammonia takes place, with evolution of nitrogen and elevation of temperature. Ultimately the liquid becomes turbid, and the chloride of silver is precipitated, first, as a grey powder, and, when the ammonia is entirely decomposed, as a violet powder. This precipitate is entirely soluble in ammonia, and is precipitated in a perfectly white state by nitric acid. If 20 grains of it be decomposed by zinc and dilute sulphuric acid, it yields 15 grains of silver—exactly the quantity yielded by 20 grains of white chloride of silver. Hence, the difference of the chloride in these two states cannot be referred to difference in composition, but solely to some variation in molecular arrangement.—*Journal of the Royal Institution*, vol. i. p. 393.

Phonautography.—In another part of our columns will be found the details of a very singular discovery of M. L. Scott, by means of which sounds may be made to record themselves, whether these sounds are those of musical instruments, or emitted by the voice in singing or speaking. Professor Wheatstone, during his recent visit to Paris, was invited by the Abbé Moigno to inspect the papers on which these sounds had printed themselves, and is said to have been greatly surprised and pleased with what he saw. The mark produced on the paper by a particular note is invariably the same; so, also, if a person speaks, the tone of voice in which he speaks is faithfully recorded. As yet no practical advantage has been obtained by this discovery; but M. Scott is sanguine that, in course of time, he will so far improve his apparatus that it will be capable of printing a speech, which may be written off verbatim, to the great saving of the labour of parliamentary reporters.

The Moon seen through Lord Rosse's Telescope.—In 1846, the Rev. Dr. Scoresby had the gratification of observing the moon through the stupendous telescope constructed by Lord Rosse, at Parsonstown. It appeared like a globe of molten silver, and every object, to the extent of 100 yards, was quite visible; edifices, therefore, of the size of York Minster, or even of the ruins of Whitby Abbey, might be easily perceived if they had existed. But there was no appearance of anything of that nature, neither was there any indication of the existence of water, or of an atmosphere. There were a great number of extinct volcanoes, several miles in breadth; through one of them there was a line of continuance, about 150 miles in length, which ran in a straight direction, like a railway. The general appearance, however, was like one vast ruin of nature; and many of the pieces of rock driven out of the volcanoes appeared to lie at various distances.—*Curiosities of Science.*

Photographic Notes and Queries.

IMPROVED DIPPER.

Sir,—In your last number, a Querist desires a dipper that shall not knock out the bottoms of glass baths. Lake Price's silver dipper is recommended, but I am afraid that C. D. would look very much in that physical condition that his initials indicate on opening the bill after ordering this implement from town, and discovering its cost to be £2 2s., that being the price of the instrument named; as the ordinary dipper can be made for twopence, this discovery is rather startling.

A cheap dipper can be made, that attains the end desired, by cementing pure sheet gutta percha round the bottom of the ordinary dipper, so that a half tube is left between the bottom of the dipper and the glass bath on its introduction,

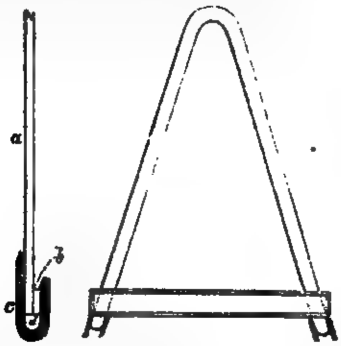


Fig. 1. Fig. 2.

violent concussion being thus prevented. Fig. 1 shows this arrangement:—*a* the glass stem, on to which is cemented the glass rest *b*; *c* the strip of gutta percha cemented round the arrangement so as to form the semi-tube *d*.

If the ordinary glass dipper adheres to a plate, I have always found it readily detached by letting it slide down the back of the plate, instead of trying to force the plate from the dipper; but the two objects desired may be attained by having a stout glass rod bent into the required angle, and so that its two arms are parallel, and a stout flat-edged bar of glass cemented across, so that ¼ inch of each arm is left projecting, on to which two caps of gutta-percha tubing, ½ inch in depth (or less), are cemented, as in fig. 2. This arrangement breaks the concussion, and the plate will not adhere.

S. Highley.

WASHING POSITIVE PRINTS.

Sir,—Anything which will facilitate the process of washing photographic prints after toning is of importance, particularly to amateurs whose time is often limited. I therefore send you the following suggestion, which, in practice, I have found fully to answer, and entirely to relieve the paper of the chemicals. After taking the print from the toning bath, rinse well in clean water, then place it on a smooth board slightly inclined, having a tap gently running over it, or a pail of water with a piece of India rubber tubing to form a siphon will do as well, and while thoroughly soaked, pass over the print a roller of India rubber pressed gently; continue this for a short time, and put in a pail of water to soak; after an hour or so, or whenever convenient, the rolling may be repeated for a few minutes, after which the print can be allowed to dry, and mounted without any danger of its fading. The roller is very easily made. Take a piece of vulcanised India rubber tubing, about 1½ inch diameter, pass through the centre a piece of wood, and then mount it on a handle like a printer's roller. Pardon my trespassing on your valuable space; but such a hint would, some time since, have been invaluable to myself.

A Benefitted Reader of the "Photographic News."

PORTABLE DARK BOX.

Sir,—Having seen in your paper several suggestions for portable dark boxes, all of which may be very good, but, in my idea, are open to the objection of "weight," will you allow me to describe my "dark tent," which I am in the habit of constantly using, and the total cost of which was from 10s. to 12s.?

First I purchased (second-hand) a *child's carriage*—the old-fashioned kind with two seats. The seats were easily converted into boxes—the one to contain water-tight bath, collodion, developer, and fixer—the other, levelling stand, box of plates, and a can for water. The body of the carriage contains the camera, stand, and canvas cover.

Next I had made four supports, six feet high, with folding hinge in the middle (so as to fold into three feet), with the lower ends iron-pointed. These, when I wish to "pitch my tent," I thrust into the ground at each corner of the carriage. The cover for the whole is three thicknesses of glazed yellow calico, and one of black outside. This I simply throw over the four uprights, covering carriage and all; and, if the wind is high, fasten with a few pegs to the ground, leaving, of course, sufficient room to get under.

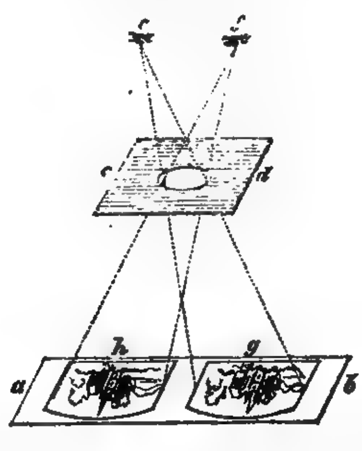
Such is my apparatus for wet collodion; but for dry, which I mostly patronise, it is still more simple. I then take only my box of prepared plates—*my carriage* and my calico cover. When I wish to change a plate, I put the box in the carriage, kneel, and throw the envelope over self and carriage, and am able to manipulate with the greatest ease.

I may just say in conclusion that I am persuaded any one who will try this plan, during the forthcoming summer months, will find a great difference in the amount of fatigue that they experience in *drawing* along their apparatus after them, and in *carrying* the same, however portable the box may be made.

Sarnia.

THE STEREOSCOPE.

Sir,—As a sequel to X. P. R.'s note on the stereoscope, in a recent "News," I beg leave to send you the following:—Take a piece of cardboard *c d* (see diagram) with a hole—about one inch in diameter—in the centre of it; hold



the card in the hand and look steadfastly at an ordinary stereogram—but having the pictures reversed—through the hole, in such a manner that the eye *e* sees the picture *g only*, and the other eye *f* sees the picture *h*. The effect will, of course, be beautifully stereoscopic.

J. W. Fall.

CLEANING DAGUERREOTYPES.

Sir,—Can any of your correspondents inform me how to clean a daguerreotype from dust, which has got in under the frame? Not understanding that branch, I am afraid to touch it without advice.

Zingir.

QUERIES ON PHOTOGRAPHS IN NATURAL COLOURS.

Sir,—Perhaps Mr. Barrett, your correspondent in a recent number of the "News," would be kind enough to inform us what collodion and bath he used to obtain the photograph in natural colours he speaks of, and also any other particulars he thinks might have conduced to its production; by so doing he would much oblige me, and, I think, most of your subscribers.

Would not collodion transferred on albumenised paper (I mean plain albumen without any salt) do very well for printing positives by development? H. F. S.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

Sir,—Can any of your correspondents oblige me with an explanation of the cause of the following: when using the varnish in finishing the photograph on glass, it will often dissolve the picture entirely away—it often happens to me. I have inquired in vain as to the cause. H. T. (M.R.C.S.)

ANSWERS TO MINOR QUERIES.

Fading of Glass Positives.—*Cyanide* has had some glass positives which had been fixed with cyanide of potassium, washed, and then left to drain, almost entirely fade away in a few hours. The reason of this is imperfect washing. The greatest care should always be taken to wash away cyanide of potassium from photographs, as, if the least trace be suffered to remain, there will be danger of ultimate fading.

Cleaning Glass Plates.—*Thomas W——* has taken every precaution which he can devise to avoid the presence of spots in his pictures, and still they make their appearance, their numbers bearing apparently a direct proportion to the amount of trouble he has taken over the preparatory cleaning of the glass. This is very likely, as he informs us that he uses a silk handkerchief to polish the glass with, and takes care to have them both dry and warm. In this manner, the friction of the silk against the glass causes the latter to become very electrical, and thus to attract to its surface all the dust which T. W.'s exertions have so plentifully raised around it, and, of course, the longer the polishing process continues, the more dust will be raised, and the more the glass plate will attract it. If our readers would only use the plate-cleaning liquid which we gave at vol. i. p. 156, using a clean piece of wash-leather for the final polishing, and not paying *too* much attention to this latter part of the process, they would never complain of dirty plates.

Bending Glass Tubes.—*H. S. I.* asks how to prevent glass tubes from flattening together at the point where they are required to be bent. The tubes selected for this purpose should not be the very thin kind, but should have the sides of a tolerable thickness. It will be as well to endeavour to dispense with the use of a blowpipe, as, except in the case of hard German glass or tubes of great diameter, the operation can be very well effected with a spirit lamp, or, in preference, a fish-tail gas burner. Place the tube along the broad part of the flame, introducing it gradually so as to avoid danger of cracking it, and heating about two inches or more of its length, disregarding the deposit of carbon. The tube must be kept moving round on its axis all the time, and as soon as it is found that the glass is sufficiently soft to enable it to be bent (which can be told at once by a slight lateral pressure of the hand), it must be removed from the flame, and, in a steady, firm manner, bent into the required shape. The tube must be firmly grasped at each end, and, during bending, the two legs of the tube must be kept in the same plane, any tendency to one side or the other being easily seen and avoided if it be held so that the eye can look along the plane in which it is being bent. In very thin tubes, or such as are of larger diameter than about half an inch, there is generally experienced great difficulty in keeping the bore uniform throughout, the glass having a tendency to flatten at the bent portion. In the case of tubes of not larger bore than that just mentioned, a skilful operator may generally preserve the bore tolerably cylindrical, by placing his lips to one end and gently forcing air into it while bending, but for tubes of a larger diameter the following plan will be found preferable:—Fit a cork loosely into each end of the tube, and then fill it with dry, fine sand. Make a small charcoal fire, in such a way that about three or four inches in length of the tube can be raised to a dull red heat. Now, holding one end of the tube firmly in each hand, gradually introduce the part where the bend is wished to be in the fire, and rotating it as before, gradually bend it into shape. Care must be taken in this case not to have the temperature higher than is absolutely necessary, as, otherwise, the sand will fuse to the inside of the glass and roughen it. In all cases where tubes are to be bent it will be advisable to make that side of the tube which is to be the outside convex part of the bend slightly hotter than the other part, by allowing it to linger a little in the heat whilst rotating; in this w[ay the] chance of forming an unsightly flat bend is diminished.

TO CORRESPONDENTS.

We feel it necessary to state that the remarks addressed to J. Heywood, in the last column, of p. 48, do not apply to Mr. John Heywood, the Secretary of the Chorlton Photographic Association.

W. D.—Your specimens are in advance of anything we have seen by the chromatype process, and seem capable of still greater improvement. We shall be glad to hear further from you.

A Practical and Hard-working Amateur.—1. The description of the method of taking stereograms from flat surfaces will be found in vol. i. p. 85 of the "Photographic News." 2. The collodio-albumen process. 3. It will shortly be advertised in our columns.

Ignoramus.—1. The entire lens, with brass mounting, &c., must be turned round, so as to face in the opposite direction, the component parts of it remaining untouched. 2. Your lens is not a good one.

T. Grey.—We cannot recommend any particular maker. Consult our advertising columns.

S. Taylor.—R. D. (Kirkaldy).—W. and D. D.—Received.

Captn. R. A.—The snowy appearance is a very common fault in stereograms, and is only to be remedied by employing a collodion which gives less intensity, and exposing the full time in the camera. We cannot recommend any particular person as a photographic printer.

H. R. Rump.—Received too late for the last number.

Aurora.—We are unable to explain the cause of the dark appearance from the description you give.

E. M.—The streaks may be removed by allowing the collodion to settle, and filtering and acidifying the bath.

One in the Country.—1. We do not know the orthodox formula for raspberry syrup. We are, moreover, of opinion that you would be likely to meet with more success in some other dry process; the collodio-albumen, for instance. 2. We know no more particulars than are given in the "News."

C. Williams.—The words "over" and "under" were, by a slip of the pen, transposed in the sentence. It will be corrected in an erratum.

H. Eldridge.—We can give you no more information than will be found in Nos. 28 and 29.

J. W. A.—*Nearly* neutralise your bath with carbonate of soda, and then add a few grains of acetate of soda; by this means you will avoid filtering the bath.

J. T.—We know of no other name.

M. Henry.—Your letter did not reach us, or it would have been answered. Your print looks as if the silver bath had not been strong enough. We think if you increase the strength to 90 or 100 grains to the ounce, you will not meet with the difficulty as to colour.

J. Weaver.—We are unable to give you the required information. Apply to some journal specially devoted to the science

Oss.—1. See vol. i. p. 33. 2. You can do nothing with the collodion which has been poured into a nitric acid bottle.

J. P. C.—1. Add 2 grains of bromide of cadmium to each ounce of your collodion. 2. We do not know any other way to make red collodion but by adding iodine to it, or keeping it till it becomes red spontaneously.

Embryo will find all necessary information on the subject of putting together a portrait combination by consulting the index of our first volume.

Alphonso X.—If a plate be prepared with bichromate of potassa and gelatine, as in Mr. Talbot's photoglyphic process, and after exposure to light, it be soaked in water, the unexposed parts will swell and become sufficiently raised to enable an impression to be taken from it. This is the principle of the photogalvanographic process.

J. Partridge.—Received too late for the last list.

B. Abbott.—We shall be very pleased to see the "Cautions" you have drawn up.

Wallis.—Your bath is out of order; but you do not give any information which would enable us to say how to remedy it.

S. Taylor.—We have no means of distinguishing amateurs from other photographers, except by means of the information contained in their letters; consequently, although we are willing to carry out the request, that the club be confined to amateurs, it will be impossible to do so with any degree of accuracy.

F. Erach.—A good lens, bright light, and chemicals in as perfect order as possible, are necessary for working quickly.

Bengal.—Expose your bath to sunshine, in a flat dish, for an hour or two; then filter, and acidulate, if necessary.

Quæsitor.—All took place in the dark, as we distinctly stated. See our Paris correspondent's letter in to-day's "News."

Amateur wishes to know whether it is possible for him to obtain a ¼ plate camera and portrait lens on hire for the season. We do not know, but should think that if he were to advertise for such a thing, there would be no difficulty in obtaining what he wishes.

Carlo.—The spot is either caused by the developer being poured on at that place, or by a ray of light falling on the plate at that part through a small hole.

A Benefitted Lady Amateur.—Our fair correspondent has raised our curiosity; will she not gratify it by forwarding the receipt?

J. Simpson.—We are much obliged by our correspondent's letter and views, and will give them a more detailed notice in our next. We should much like to see the other pictures mentioned, and will endeavour, if possible, to avail ourselves of our correspondent's polite offer.

Communications declined with thanks:—P.—Solem.—Gum A.—D. D.—Old Hand.—B. P. R.—Jane.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—F. A. N.—Mr. O.—B. R.—T. K.—M. R. B.—B. X. O.—Cato.—Καλος.—Jamieson.—Experience.—Green Colour.—F.Y.T.—Coal.—M. R. I. A.

In Type:—T. B.—T. P. B.—M. D.—F. R. E.—Photos.—J. C. S.—T. J. B.—R. P. H. N.—W. L.—W. Hayes.

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THE PHOTOGRAPHIC NEWS.

Vol. II., No. 33.—*April* 21, 1859.

THE COMPARATIVE TRIALS OF PHOTOGRAPHIC LENSES.

BY T. GRUBB, M.R.I.A.

Permit me to offer some remarks and suggestions relative to the late comparative trials of the Voigtlander and Petzval lenses. There appears to be an increasing feeling, if not of a necessity, at least, of the desirableness of such trials being made, and it is evidently most important that they be conducted with every precaution to insure accuracy of result.

Such trials are by no means as simple a matter as many would suppose. In the instance before me considerable care has evidently been taken, and every endeavour made, to insure a correct result. It will, however, not unfrequently happen (and the present instance is, perhaps, not an exception) that *after-consideration* will show the experimentalist that some data, which it would have been desirable to have recorded, has been omitted, or that some condition (or property) of the apparatus which had been under examination has not been adequately provided for or recognised.

Before proceeding further let me explain that I by no means apprehend that the most rigorous examination would alter the verdict of the late trial. There would appear to exist a difference between the two lenses examined too decided for this. My object in penning the subjoined remarks, &c., is that of affording matter which may prove of use in future trials, and where the difference between two or more lenses is much less than that which we are led to conclude exists in the lenses forming the subject of the recent examination.

Taking, in the first place, the examination of the lenses, when arranged as portrait combinations, I find the recorded data to be nearly as follows:—The lenses were nominally of the same aperture and focus, one lens having three inches aperture, the other one-tenth more in area. The focal lengths (nominal or actual) are not stated, and, most likely, did not agree; the distance at which the lenses were placed from the screen (or objects) being equal, and two and a half feet. No mention is made of the extent of field covered (or attempted to be covered) in any of the experiments.

The first suggestion I have here to make is, that while such data may have been abundant for satisfying the parties engaged in the trial, the record of the trial would be much more generally useful if the data given had been fuller—had, in fact, included that which I have alluded to as *not* given. Trials, whether comparative or not, to prove generally useful, should be so recorded that they may be compared with other trials, made at a different place and time, and by other parties.

My second suggestion here is, that in all such trials it would be desirable, as a preliminary step, to *proportion* the acting apertures of the lenses, *pro tem.*, to their respective focal lengths. The manner of doing this with sufficient accuracy is usually at hand. Should the lenses to be examined differ much in focus, in such case focus them (by preference) upon rather distant (out-of-door) objects, but if they (the lenses) be of nearly equal focus, the length of an ordinary room will suffice; in the latter case, place the lenses as far from one end of the room as practicable, and focus them for two marks made so far apart on the distant wall that their images will be considerably asunder in the cameras. In either case, the cameras should be equi-distant from the objects. The images on the greyed surfaces or their distances will be directly proportioned to the focal lengths of the lenses. The next thing to be done is to bring the acting diameters of the lenses to the same proportion, by a temporary diaphragm of cardboard placed as close as practicable in front of the first combination. It may be sufficient to prepare one such diaphragm only, viz., for that lens whose aperture without it would be disproportionately large, but I would, in general, prefer to place a diaphragm before each lens. The diaphragms being not only of the proper proportionable apertures, but also these being somewhat smaller than the apparent apertures of the lenses, so that on placing the diaphragms and removing the focussing screens of the cameras, it will be seen that it is the temporary or cardboard stop, and not any permanent or internal diaphragm, which really limits, *pro tem.*, the aperture of the lenses.

I conclude that the two lenses recently under examination had field combinations of nearly equal diameter. In such case no further "stopping" would be required to bring them on a par for examination; but should lenses be under trial which, while equal (or adjusted, *pro tem.*, to equality) in other respects, *have field lenses differing much in their proportionate diameter;* then, before an estimation be attempted of the relative qualities of their *lateral* pencils, a temporary diaphragm should be placed close to the last lens of that combination which requires it, of such size as will equalise the acting diameter of its field lens with that of the other combination under trial.

The next point to discuss, in case of a difference of focus existing in the lenses, is the *respective* distances at which we should place the cameras (or rather lenses) from the objects. The simplest plan to adopt, and one sufficiently accurate when the foci do not differ much, is to place the lenses so that their images will be of equal size. But the more precise method, I apprehend, is to place the lenses at those distances respectively which will cause their images to be directly proportioned to their foci. If the latter plan be adopted, we should, in examining the degree of perfection of lateral images, compare the corresponding portions of the images, not a measured distance from the centre of the field.

I conclude that, in the recent trials, the lenses were of nearly equal foci, and that in placing the lenses at equal distances from the screen of objects, all was right *for so far;* but, if there be no great mistake in my estimate of the probable focus of the lenses, I consider that placing them at 2½ feet only from the screen, involved an oversight, and one which may have exerted an influence on the conclusions arrived at.

A portrait lens should be adjusted in its spherical aberration for the work it has usually to do, viz.—to take pictures distinctly of objects removed, perhaps I might say as a minimum, four times, and usually eight times its focus; and this it can be. Most photographers are aware that if they use the portrait lens in a reversed position in ordinary work, they cannot expect a distinct image. Now, assuming the principal focus of the lenses under trial to have been fifteen inches, and the distance from the screen as stated, viz.—thirty inches, then the conjugate focus would be also thirty inches, the objects and their images would be equal in size, and equi-distant from the lens, and the convergence of the rays at one side, and the divergence on the other side, of the lens would be equal. In short, the lens so circumstanced,

would be placed midway (so to speak) between that of its best and worst position.

Now the effect of approaching a well-corrected portrait combination excessively near to objects, is to produce under-correction of the spherical aberration; and to show how this may have more or less affected the results arrived at under the late trials, it is only necessary to suppose that one of the lenses was more or less over-corrected in this respect, and the other under-corrected. Such two lenses might give equally distinct images under ordinary circumstances, while a very near and unusual approach to objects would improve the image of the first, and increase the indistinctness of the image of the second lens.

This communication has already exceeded its intended length, so I forbear sending the few remarks I have to make on the lenses arranged as view combinations, until a following week.

Dublin, April 13, 1859.

DEVELOPMENT OF AN IMAGE AFTER FIXING.

The following is the communication made by M. Davanne to the French Photographic Society on Mr. Young's experiments, published in the 'Photographic News,' vol. i. p. 166, and referred to at some length in an interesting letter addressed to us by Mr. Sidebotham, at vol. i. p. 173.

"The Journal of the French Society recently contained the statement (copied from the 'Photographic News') of a curious experiment made in England. Mr. Young has shown that a proof on albumen, or albumenised collodion, may be developed in broad daylight, by the ordinary agents, if care had been previously taken to fix it with hyposulphite of soda, so as to remove all the iodide of silver in the operating room.

"This experiment, which at the first glance appeared singular, deserved to be repeated—which accordingly has been done by M. Bayard and myself, each operating by himself, and under slightly different circumstances. While M. Bayard, after fixing his plate, left it to dry in broad daylight and did not develop it until the evening, I developed mine immediately after fixing. The results obtained were sensibly the same; and confirmed the experiments of Mr. Young. The tones obtained differed slightly from those yielded by the ordinary processes; they were redder, the development was slower, but it nevertheless attained great intensity.

"On reflecting on the different reactions which must be produced in this experiment, I have been led to the conclusion that, far from diverging from photographic theory, this new process only confirms it, and even enables the action of the light on the sensitive film to be demonstrated.

"In a communication previously made to the Society, I thought that the development of the photographic proof arose not from a subsequent reduction of the iodide of silver, but from a deposit made in virtue of a molecular attraction. I cannot offer a more convincing proof than that which Mr. Young here gives, since he begins by removing the iodide of silver, and afterwards develops the image by producing a deposit on the glass.

"It remains for me to demonstrate the cause of this molecular attraction, attributed by some to a purely physical modification of the iodide of silver; by others, to a commencement of separation between the elements iodine and silver; but by the majority to a real but invisible reduction of the iodide of silver, at first, perhaps, to sub-iodide, and then probably to metallic silver.

"Mr. Young's experiment may enable us to verify these hypotheses.

"If the iodide of silver had only undergone a purely physical modification, its solution by the hyposulphite of silver ought to annihilate all traces of the image; we see that this is not the case.

"But if there is a reduction into metallic silver, the development in open daylight is easily explained. The hyposulphite of soda removes the excess of iodide while leaving the metallic silver, and in the developing bath this causes the development of the proof. If it be really thus, every re-agent capable of attacking metallic silver ought to annihilate the image; now, it is sufficient to treat a fragment of a proof, previously fixed with hyposulphite of soda, with nitric acid, diluted with half its volume of water, and heated slightly, to promote the solution of the molecules of silver and hinder the development. The re-action will be the same with cyanide of potassium, iodised cyanide, or a solution of iodine in iodide of potassium, because all these bodies have an energetic action on metallic silver.

"This explanation, it is true, would be equally good if there had been a formation of sub-iodide of silver, afterwards divided by the hyposulphite of soda into iodide of silver and metallic silver. But why complicate the reaction by the presence of a sub-iodide, which hitherto has not been isolated, of which treatises on chemistry do not speak, and the existence of which is at least problematical? And, besides, the action of nitric acid is exactly the same before as after the hyposulphite of soda, and if we admit the presence of a sub-iodide, it is at least probable that the nitric acid would have no action until after the action of the hyposulphite.

"It seems that now the theory of negative photographic action may be described in a very simple manner.

"1. *Reduction by light of a very minute part of the salts of silver to the condition of metallic silver.*

"2. *Development of the proof in consequence of the deposit of new molecules of silver, furnished by the reducing bath, and fixed by virtue of the molecular attraction.*

"On the subject of Mr. Young's experiments, *La Lumière* makes the following remarks:—

"We know that when a sensitive film is once acted upon, the action continues to propagate itself even after the plate is removed into a dark place. If the light which has begun to act on the iodide of silver continues its action when it is no longer present, one may readily conceive that this latent action may have been able to modify the iodide of silver, in such a way as to render it insensible to the action of the hyposulphite of soda bath; that this iodide may be reduced to the metallic state, or to the condition of a *sub-iodide*. We are inclined to regard the phenomenon in the latter light, and we thus explain to ourselves why the image which, in Mr. Young's experiment, does not appear after the hyposulphite of soda becomes *suddenly* visible when submitted to the action of the developing baths. If the image, from the moment of contact of the light with the iodide of silver, is formed of metallic silver, we cannot conceive why it is invisible when once freed from the excess of iodide by the washing in the hyposulphite; and we cannot well explain to ourselves what the action of the developing agents can be. Hitherto we had believed that the object of their use was to lead to the image being formed solely of metallic silver. If this reduction was already completely affected, the image ought to appear after the hyposulphite bath, and the developing agents would be useless. It seems to us, therefore, more rational to explain the phenomenon in the following manner:—

"The light eventually reduces the iodide of silver to the state of metallic silver, but this phenomenon does not take place at once and suddenly; it is only accomplished in virtue of a series of partial decompositions, the more as the light is more intense, and acts on the iodide for a longer time. From this series of partial decompositions results at first a kind (*une espèce*) of invisible sub-iodide, after the hyposulphite bath, in which it is but slightly soluble, and which, in passing to the condition of metallic silver, changes with the greatest facility into this state, under the slightest influence of developing agents.

"We believe that this is the true explanation of all heliographic phenomena in which the salts of silver are employed."

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

OF INSOLATION.

REGARDED from a purely practical point of view, it is easy to define in a few words the act of insolation. This definition may be stated by saying that, under the influence of the luminous rays, certain argentiferous compounds become coloured; but, regarded from a theoretical point of view, it is a different matter, and the solution of this interesting question has hitherto remained doubtful. We will endeavour to throw some light upon it.

It is generally admitted that in this act of exposure the argentiferous compounds approach the elementary condition; but is this action shown in a complete separation of the elements, or by a mere augmentation of the basic element? In short, are new combinations formed between the argentiferous compounds and the substances which surround them? These are the questions to be solved.

One hypothesis alone has been announced on the first point, and some learned individuals, guided by induction more than by experiment, have admitted that in their action on the chloride of silver Ag Cl, the solar rays reduce this to the condition of sub-chloride Ag_2 Cl; we shall demonstrate that nothing of the kind takes place, and that the extreme action of the light on this compound is to operate as a complete separation of its elements, by restoring it to a metallic state.

In the particular case of the production of photographic positive proofs to which we must now confine our attention, we find ourselves in presence of several substances:—1. A sheet of paper represented by pure cellulose; 2. a size whether added during the manufacture or afterwards, and generally formed of starch, gelatine, or albumen; 3. of chloride of silver; 4. of free nitrate of silver, of which the paper can be freed by proper washing.

We shall first examine in what condition these compounds stand in relation to each other at the moment when they are deposited on the sheet of paper; afterwards we will examine in what way the luminous action may be able to modify their respective functions.

The examination of the first case is easy enough, for these compounds are produced there by simple chemical reactions to which the sheet of paper serves as a support.

Let us first consider the sheet of paper; it will constitute, as we have just now said, a simple basis. Size is deposited upon it, and the same may be said of the chloride and the nitrate. A minimum portion only of these will adhere to the fibres of the cellulose.

Size, in presence of chloride of silver, constitutes a simple mixture; but, in respect to nitrate, it comports itself differently. Among others, albumen will form with nitrate of silver a white combination, insoluble, and very sensitive to light, which, as we have already shown, leads to a greater richness in silver of the sheet of paper, and, as a consequence, ultimately plays a part in the production of the proof. Nitrate of silver does not act in the same way on gelatine and starch; simply mixed together, no immediate combination results, and we insisted on this fact when we showed that these sizes exercised no influence whatever on the absorption of nitrate by the paper. Nevertheless, we have demonstrated by experiment, that these sizes greatly influenced the results; therefore we deemed it necessary to bestow a peculiar attention in marking the manner in which they would behave under the luminous influence.

Finally, and this is the only point which it remains for us to establish, the nitrate of silver in presence of the chloride forms no combination with it; it merely dissolves, as has been recently demonstrated by M. Riche, and as a consequence of this solvent action, it divides the mass in a more equal manner in the fibres of the paper.

Let us now examine the phenomena which will be produced when all these bodies shall be submitted to the action of the light.

The sheet of paper itself naturally occupied our attention in the first place, and we asked ourselves if, according to the interesting researches of M. Nièpce de St. Victor, it could not, by storing up light, to use his own expression, influence the production of the proof; we have not found this to be the case, and we must even avow that no sheet of paper, whether sized or not, exposed to the light in a printing frame, and then passed in a nitrate of silver bath, gave us any appreciable result. Possibly we did not proceed in a manner favourable to our obtaining any; possibly the light was not strong enough; but in any case it may be affirmed that the insolation of the paper itself has no influence whatever in the production of the proof.

(To be continued.)

* Continued from vol. ii. p. 3.

Critical Notices.

The Moon in the Stereoscope. Photographed by HERBERT FRY.

THE idea of a stereogram of the moon is at first sight calculated to surprise many who have not considered the subject; and even those who are best informed on such matters most probably have never seen one.

The mode in which a stereoscopic picture of the moon is obtained is, we need hardly say, by taking advantage of the moon's librations, which, for the benefit of our younger readers, we may explain is the result of the moon's motion in her orbit being quicker or slower at one time than another, while at the same time the rate of rotation on her axis is unvarying; so that we are able by means of the telescope to observe sometimes a little more of one side and then a little more of the other, alternately; and the same with respect to the north and south polar regions. The first to avail himself of this circumstance to take a lunar picture for the stereoscope was, we believe, Mr. Delarue, though whether he succeeded so well as Mr. Fry has done is a point on which we have heard different opinions.

Nobody can be more familiar than ourselves with the difficulties of obtaining a photograph of the moon of sufficient value to be used as a map; in which the mountains, craters, and other features of the moon's surface are rendered with fidelity. Mr. Fry, however, seems to have had peculiar facilities. The instrument he used was placed at his disposal by Mr. C. Howell, of Brighton. It was an equatorial telescope of nine feet sidereal focus, and about six inches and a half diameter of object glass, fitted with clock work, which, by means of governor balls, could be made to follow the apparent motion of the moon so exactly that to all intents and purposes she remained stationary while the photograph was being taken. The stereogram by Mr. Fry is a transparent positive, and, when seen by a powerful transmitted light, presents a distinct picture of the various features of the lunar surface; and is rendered of more value by the fact, that each picture is accompanied with a paper photograph in which the principal points are numbered and indexed.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued)*.

First Coat of Colour.—However simple the following may appear, it is the result of many experiments. At first it is a puzzle to even a skilful artist to convert a dark photograph, pale and death-like, with grey, harsh shadows, into the fleshy look of life, without injuring the resemblance. Some employ one method, some another; some try to kill the photograph by labouring at it, and thereby kill the likeness, as before observed. Having chosen the light copy, it is first to be pasted on hard thin millboard.

Then take Indian yellow, and crimson lake (the two brightest and most transparent colours we have appropriate). With these, in a thin wash, using a large

camel's-hair brush, go all over the flesh in a light sweep, minding not to go over the same place twice while wet, as that would disturb the albumen, making the picture rough.

Here again a difficulty is presented, which completely stops the painter, and appears insurmountable at first: the albumenised paper is greasy, consequently the colour will not enter it.

We have tried washing with gum, with ox-gall, too; the colour does not work kindly over either, but looks dirty, spotty. The best plan is the following:—Take a large dry camel's-hair brush, wet it in a weak solution of isinglass, and with this go all over the photograph, previously to giving the wash of yellow and lake just mentioned, which the paper will now take, and will always receive freely afterwards.

The picture having received a first flesh wash, will dry in two minutes; then lay it, face downwards, on the clean plate glass, and burnish it, pressing heavily on the back with the burnisher, until the dead surface produced by this first wash is made to shine.

Next, with a colour made of Indian yellow and vermilion, wash thinly over the deep shadows in the flesh. This being semi-opaque, bright and warm, completely converts the dead-grey photograph into the semblance of flesh. Let this be carefully done, watching the effect, as it comes up, to see where it may be made a little warm without being too red; which, if necessary, do with a second wash of the same colour, observing that the shadows upon the cheek are to be made redder than upon the forehead.

Hair.—Afterwards give a wash for the lights of hair, which wash may be its local or normal colour; if brown, use vandyke brown; if black, use indigo first for the high lights, and, by the side of those high lights, sepia, with vandyke brown added for the shadows. If red hair, use venetian red, burnt sienna, and gamboge for the general colour, with another wash afterwards of same, adding vandyke brown for shadows.

Hair is sometimes so highly reflective, as to be grey or purple in the high lights; black hair, nearly blue; these grey lights may be added with body colour thinly in the finish.

For flaxen hair, use Roman ochre; more ochre in light, more sepia in shade; bright light inclined to a lilac, pale.

Chestnut hair. Burnt umber, lake, and sepia, rather purple in deepest shadows.

Red hair. Crimson lake, Venetian red, and burnt sienna. Burnt sienna alone imitates some colours of red hair, but it is rather foxy; the colours first mentioned may be modified with Roman ochre if required rather yellow. When a sitter has this coloured hair, endeavour to introduce some colour about it to destroy the disagreeable appearance of redness, such as white or pink ribbons; but never have blue if it can be avoided, as such a colour, by contrast, will increase the redness.

Dark brown hair is represented by sepia, adding a little lake in the shadows; and in the high lights, purple.

Grey hair, reflecting some portion of blue, comes out in the photograph lighter than in nature. Sepia and cobalt make a general tint, to be varied by burnt umber and neutral tint as the case may be. As people do not care to have their hair appear too grey, white may be employed in the vicinity to destroy it; but black increases its whiteness by opposition.

Auburn hair, burnt umber, lights purple.

In finishing, a few stray hairs may be painted over the background, beyond the general masses of hair, to give an appearance of finish; and the same with a few hairs upon the face, if admissable.

It is not necessary to say more on this point, as there are plenty of works which show the compounds of tints correctly; the present being intended as an application of those principles to painting photographs.

(To be continued.)

Dictionary of Photography.

Cerolein.—that constituent of bees' wax which is soluble in cold alcohol. It constitutes about 5 per cent. of the wax. M. Geoffray has employed this body in photography, by extracting it from wax by means of boiling alcohol; and, after allowing the other constituents to crystallise out on cooling, filtering off the clear solution of cerolein. This solution is then iodised, as in the waxed paper process, and then sheets of thin French paper are dipped in and hung up to dry. They are then to be treated, in their subsequent operations, exactly as in the waxed paper process. The finished negative is, however, to be re-waxed before being used to print from.

Cellulose.—This forms the groundwork of most of the vegetable kingdom. It occurs under the greatest diversity of forms, such as cotton, linen, pith, rice-paper (the pith of the *aralia papyrifera*); and in a more impure state, together with ligneous tissue, in the form of the shells of the filbert, cocoa-nut, and vegetable ivory. In the laboratory, pure cellulose is met with as finely-carded cotton, linen, and Swedish filtering paper. It is white, tasteless, and amorphous, insoluble in water, alcohol, and ether. This body has hitherto been regarded by the photographer with interest, as being the starting point in the preparation of pyroxyline, or gun-cotton, which is, chemically speaking, *cellulose* in which a certain number of equivalents (7, 8, or 9) of hydrogen are replaced by the same number of equivalents of nitrous acid. Now, however, cellulose seems to promise to become of more immediate interest, as Dr. Schweitzer has succeeded in discovering a solvent for it, which will leave it unchanged on evaporation. The particulars of this remarkable discovery were given in the "Photographic News," vol. ii., p. 39.

Chlorine.—An elementary body, gaseous at the ordinary temperature, of a pale yellowish green colour, and a powerful irritating odour. It is very prejudicial to health if breathed; in fact, in the undiluted form it proves instantly fatal to animal life. It dissolves in water, and communicates to it its peculiar properties. It exercises a very powerful action on vegetable colours. It combines with the other elements to form chlorides, the most important of which we shall proceed to describe. In its uncombined state chlorine has hitherto been unemployed in photography, except in M. E. Becquerel's researches on obtaining photographs in the natural colours.

Chloride of Ammonium.—A salt containing one equivalent of chlorine, and one of the hypothetical metal ammonium. It is commercially know as *sal ammoniac*, where it is met with under the form of hemispherical, translucent masses, having a fibrous crystalline fracture. Those lumps which are coloured brown, owing to the presence of iron, should be rejected. It is soluble in water and alcohol, and is used by photographers in the preparation of positive paper, instead of chloride of sodium. In our opinion, however, the latter is the preferable salt of the two, as we have previously stated in the "Photographic News," vol. i., p. 252. It may be made by adding hydrochloric acid to a solution of ammonia, and evaporating to dryness on the water bath; as, however, it can be purchased of very good quality at a small cost, it will seldom be worth while for the experimentalist to prepare it for himself. Its purity may be roughly told by heating it to a dull redness on a clean fragment of porcelain, or a piece of platinum foil. When pure it should volatilise in a white smoke without leaving any residue.

Chloride of Barium.—A white crystalline salt composed of equal equivalents of chlorine, and the metal barium. It has been used by Sir William J. Newton for washing over paper on which pictures are subsequently to be printed by development. It is imagined that its beneficial action is owing to its uniting with or hardening the size in the paper.

Chloride of Bromine.—A compound sometimes used

in the daguerreotype process. It is prepared by passing a stream of chlorine gas to saturation through bromine, contained in a tube immersed in a freezing mixture. The compound is formed when the chlorine is no longer absorbed and the bromine ceases to become warm. It is a very volatile liquid, and should consequently be kept in a well stoppered bottle, in a cool place.

(*To be continued.*)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS.

Q. What produces the change of colour in the positive proof?

A. The action of light on the chemically-prepared surface of the paper.

Q. How is the nature of this change usually explained?

A. Most photographers state that the black substance which results from the action of light on the chloride of silver, is a sub-chloride; that it is this chloride of silver which forms the image; others are of opinion that it is formed by metallic silver. Both theories are perfectly consistent, as the image which subsequently to the fixing process is formed by metallic silver, may certainly be before that process a sub-chloride of silver.

Q. Is the alteration which takes place inherent to the image itself?

A. No; it is produced by the manipulation to which it is submitted, and which considerably affects its nature.

Q. How has this been ascertained?

A. By a careful analytical process conducted by gentlemen connected with the French Photographic Society.

Q. How was this process conducted?

A. By a very simple arrangement, by which the photographic proof in various stages of development was submitted to chemical analysis.

Q. What was the result of the investigation?

A. The general opinion, as the result of the inquiry, was that the positive photographic image is formed by the sub-chloride of silver, slowly changed by the hyposulphite, the researches being conducted with chloride and sulphuret of silver.

Q. What were the first steps taken in this analytical research?

A. The first inquiry was directed to the condition of the silver on the positive paper, in which no transfer had been taken. For this purpose a sheet was prepared in the bath of salt and water, and in the nitrate bath, exposed to the action of light, washed, fixed with new hyposulphite of soda, washed again, dried, and analysed.

Q. What was the result of that analysis?

A. The paper was not found to contain any trace of sulphur, which proved that there was no residue of the hyposulphite. It contained 62 parts of silver, and 1 part of chlorine, thus showing that the image was not formed by reducing the chloride of silver to a sub-chloride insoluble in hyposulphite of soda.

Q. What was the next step in the investigation?

A. The next step was to ascertain how far the hyposulphite acted on the silver in reducing it to a sub-chloride. For this purpose, a certain quantity of chloride of silver was placed in a capsule, and shaken at intervals, so as to bring every portion of it under the direct influence of the light. The silver turned black; was afterwards washed with water, then with new hypo., then again with water, finally dried, mixed up with carbonate of soda, and reduced by heat. The result of this investigation proved that the residue, after the washing with hyposulphite of soda, *was not* a sub-chloride, but pure silver. The ordinary experience of photographers verifies the result of this experiment, that a sheet of positive paper exposed for a long time to the light, at last presents on its surface the colour and character of metallic silver. The partisans of the sub-chloride theory admit the insolubility of sub-chloride of silver in nitric acid. But it has been ascertained, beyond all doubt, that a proof, the surface of which ought—according to the theory—to be a sub-chloride, and therefore insoluble, disappears on the application of nitric acid.

Q. How was this investigation continued?

A. The inquiry was next directed to the real action of the hyposulphite of soda on the positive proof, as it is argued that pure hypo. may leave sulphur in the proofs which is expelled by the subsequent washing. By pure hyposulphite of soda is meant that which has not been used before, and which contains neither acids nor salts of silver. Here the conductors of the experiment encountered considerable difficulty. In numerous experiments repeatedly made on sheets prepared with chloride of silver, fixed and thoroughly washed, they did not find that the sulphur equalled in quantity that which is contained in the ordinary paper of commerce; they supposed that the sulphur, therefore, was not left by the new hyposulphite of soda, which was, perhaps, expelled completely by the water baths, and could not, therefore, be the cause of the destruction of the proof.

Q. Is the careful washing of the proof unnecessary?

A. No, the photographer cannot be too particular about it, as it is certain that if the proof has not been well washed it will still contain some traces of hyposulphite of soda, which suffice in a short time to obliterate the photographic image, wholly or in part.

Q. What was the next step taken in the examination?

A. To discover the chemical condition of old proofs, proofs on which photographic images had been taken. A selection was made of those proofs from which the image had been almost entirely effaced, and after they had been soaked for some time in old or acid hyposulphite, it was found that they changed to a dark violet; they were afterwards immersed for twenty-eight hours in distilled water. All the proofs contained a large quantity of sulphur, some more and some less, but most of them a proportion equal to that of the sulphite of silver. It was ascertained that between a common proof and a proof fixed in the ordinary way there existed a considerable difference: one contained sulphur and the other did not, from which it appeared that the sulphur had much to do with the alteration of the proof. An effort was then made to ascertain in what manner the sulphur acted on the proof, and for this purpose five baths were prepared:

1. A weak solution of sulphide of ammonium.
2. A solution of hydrosulphuric acid.
3. A solution of hyposulphite of soda mixed with a little acetic acid.
4. A bath of hydrosulphuric acid gas.
5. A bath of hyposulphite of gold and soda (sel d'or of the photographers) to which was added a small portion of sulphur.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, April 19, 1859.

The great photographic talk of the day is the opening, at the Palais de l'Industrie, of the third public exhibition of photography, organised by the *Société Française*, which, as we announced in our last letter, was to be opened punctually on the 15th. The society has been too punctual—probably that the photographic exhibition might vie, in this important quality at least, with its gorgeous sister, the exhibition of paintings—for the whole of the work is not finished, many pieces are still in the act of being attached to the walls; and, what is worse than all, the catalogue, which was only

given to the printer on the 1st of April, has not yet made its appearance, so that many fine proofs, whose authors have been too modest to print their names underneath them, or who have contented themselves with simply inscribing their initials, will not find themselves at the top of the ladder of fame by a "lift" from our pen until the catalogue has appeared.

Among less retiring photographic artists, and foremost among those whose names salute us at every corner of Paris, whose cards and addresses are—and very properly—carefully applied to each group of photographs they exhibit, we will mention M. Nadar. He has exhibited a whole gallery of portraits and fancy pictures (which we might perhaps entitle *photographies de genre*), the greater portion consisting of most excellent portraits. Here are figured some of the more remarkable men of the day, and M. Nadar's "Gallerie des Contemporains" is well worthy of notice. In it we have portraits of the composer Rossini, the chemist Pelouze, the politician Guizot, the novelist Sandeau, &c.—most admirable photographs. In studying this collection to-day we were struck with a peculiarity which, we might almost say, *characterises* at once M. Nadar's figures. In most cases neither hands nor arms are anywhere to be seen, both are most ingeniously hidden. This is so cunningly done that the spectator does not miss them in the least in a single proof; but it strikes us immediately when we see some 50 or 100 proofs side by side. Ladies are elegantly wrapped in cloaks or mantillas, or they are grouped in such a manner that the hands at least are totally hidden.

This circumstance quite banishes any chance of failure by the photographic reproduction of hands and arms, which so often completely spoil the best of photographs by their terrific proportions, or their unsuccessful development.

M. R. J. Bingham, a Paris photographer, with an English name, will perhaps carry the day, in this exhibition, by his magnificent copies, or, to use the French term, *reproduction*, of pictures. What a splendid collection of proofs! All the finest pictures of Paul Delaroche most exquisitely copied—every feature, every line, every shade is there—and for a moment we actually forget the want of colour. Indeed, colour could not add to the beauty of these proofs. M. Bingham has exhibited a series of *chefs-d'œuvres*. They are *chefs-d'œuvres* of the artists whose pictures he has copied, and they are *chefs-d'œuvres* of photography. Among the more remarkable is a reproduction of the famous "Hemicycle," painted by Paul Delaroche, in the *Palais des Beaux Arts*, representing all the great artists. In M. Bingham's proof every portrait is as perfect as in the original painting.

Here we have another example of the immense advantages of photography in certain circumstances. What pencil, however practised, could copy from the "Hemicycle" the figure of Vandyke, of Rubens, or of Raphael, for instance, and make this figure a true "reproduction" of such an artist as Paul Delaroche? But photography gives us every line as it was drawn by the great master himself.

M. Michelet, of Paris, has also exhibited a great number of photographs of pictures, some of which are very beautiful. A few of them are copies of pictures now exhibited for the first time in the large exhibition, to which we alluded above. Such is the "Siege de Balaclava," &c. We have a friend in the North of England who would not give a straw for a picture unless there was a *soldier* in it. The "Siege of Balaclava" would probably suit his taste. "La Cassacia" (Venice, 1560), a well known painting by De Beaulieu, is such an admirable piece of composition that it did not require M. Michelet's talent, as a photographer, to make a most beautiful photograph of it.

M. Desmaret has exhibited a considerable quantity of portraits. Now, we perceive that as photography progresses, as its manipulations become more thoroughly understood, both chemically and artistically, it becomes more and more difficult for the impartial observer to give a true idea of the merits of a photographic production—its superiority or nferiority when compared with others. M. Desmaret's portraits are good, though not equal to Nadar's, perhaps, in an artistic point of view.

M. Braun, of Dornach (Haut Rhin), who is an artist as well as a photographer, has embellished our exhibition with some magnificent views—some of the largest we ever saw. The fine tone of his productions, the lights and shades, together with the beauty of the minute details—all produce a very charming effect. His collection consists principally of Rhenish scenery.

M. Braun has a powerful rival in the person of Dr. Lorent, of Venice, whose photographs this year are even finer than those which made such stir at the Brussels Photographic Exhibition, in 1857. His proofs are on *albumenised paper* from *negatives on waxed paper*; they are very large. The most beautiful is, perhaps, his group of "Date Palms." The strong tone of some of Dr. Lorent's interiors is very remarkable, and places him at once among the first photographers of the day.

Disderi and Co., of Paris, have exhibited a great variety of portraits, copies of pictures, small portraits for visiting cards, &c. We remark in this collection a case of curiosity proofs, among which are two examples of colours produced photographically, and in this respect are worthy of attention. Probably, when these were first produced, all the natural colours were present, but have gradually faded, until only two or three tints remain. The first is a small full-length portrait of a damsel, framed in a brooch. The dress consists of dark and light coloured stripes, the cloth of the table, near which she is standing, is of a reddish brown, and the wall which forms the background is of a yellowish tint. The second is a view of the "Invalids;" the building is of a pinkish colour, not very far wide of the natural aspect of this edifice on a sunny day; and the sky of the most magnificent blue. This proof is very remarkable; it is taken on enamel.

M. Adam Solomon, a sculptor, exhibits a series of very beautiful portraits, which deserve a longer notice than we can afford to them to-day. In most of his proofs we recognise the action of salts of gold, which accounts for their peculiar dark colour, and which, in some instances, produces an admirable effect, but, in general, casts an unnecessary degree of gloominess over photographic productions which would otherwise be considered very good.

As usual, MM. Bisson's monumental photographs surpass anything of the style we ever saw. The most beautiful subject in their collection of this year is a portrait of the Empress, after a picture by Winterhalter. They exhibit, also, two reproductions of engravings, which it would be impossible to distinguish from the originals, unless chemical means were employed.

We will notice to-day, *en passant*, some pretty landscapes exhibited by A. Civiale. They consist of mountain scenery, cascades, ravines, &c. The spots are chosen with much taste and the execution merits much praise. We have here a large panoramic view of the Pyrenees, which, considering the gigantic undertaking, has been tolerably successful. Then, a view of the Maladetta, of the torrent de Pique (Valée de Luchon), &c., which give an admirable idea of the scenery in the Pyrenees.

M. Claudet, of London, considering the magnificent establishment he has in Regent-street, has a comparatively poor collection here. A reproduction of Landseer's "Bolton Abbey" is pretty good; and the same may be said of the portraits M. Claudet has exhibited.

Roger Fenton, who shone so brilliantly at the Brussels Exhibition of 1857, has not answered our expectations. Among the proofs he has exhibited, we will notice, as one of the finest in the whole exhibition, his "Glastonbury Abbey." His "Nubian Girl carrying water," also deserves attention.

Mr. Robinson, of Leamington, has sent to our exhibition some very poetic and some very melancholy subjects. His photographs deserve much notice. Some of the few he has exhibited here are exquisite. His "Sulee," a young

girl seated carelessly in an old chair, shows considerable taste, art, and execution. Altogether this is about one of the best photographs we ever saw.

Mr. Maxwell Lyte exhibits a great number of landscapes, which we have no time to notice to-day; and the views of the country around Pernambuco by M. Stahl give us an excellent idea of tropical scenery.

There is yet much to notice. Altogether this may be said to be one of the finest exhibitions of photography ever organised, and does much credit to the *Société Française*. We shall return again to it in a future letter.

At the last meeting of the *Société Française de Photographie* a report was read by M. Paul Perrier on the proofs, &c., presented as competitions for the prize of 10,000 francs, to be given by the Duc de Luynes to the inventor of a process by which the black portions of positives shall be as solid and unchangeable as the carbon of lithographic or printer's ink.

The competition for the principal portion of this prize, 8,000 frs., is prolonged for three years more. To-day the committee thinks proper to award the other 2,000 frs., which will be divided between Messrs. Poitevin, Pouncy, Salmon and Garnier, and Girard and Davanne. M. Poitevin, who appears to have been the first to have conceived the idea of positives in pure carbon, receives a gold medal, value 600 fr. To M. Pouncy on the one hand, and to Messrs. Salmon and Garnier on the other, the society awards a silver medal, "for having, by applying the idea of M. Poitevin, obtained positives in pure carbon with at least a partial success." Each of the two silver medals is of 500 frs. value; and to Messrs. Girard and Davanne a medal of 400 frs. value.

We have a new process, by M. Nièpce de St. Victor, for obtaining red, green, violet, and blue photographs.

Here is a description of the process in a few words:—

Red Proofs.—The paper is prepared with nitrate of uranium at 20 per cent.; it is plunged for 15 or 20 seconds in the solution, and then dried by the fire in a dark place. The length of exposition in the camera depends on the force of the sun, &c.; it varies from 10 minutes, when the sun is bright, to an hour or more on dark days. On leaving the camera the proof is washed for some seconds in tepid water (50° or 60° centigrade); it is then plunged into a solution of red prussiate of potash at 2 per cent. In a few minutes the proof acquires a fine blood red colour. It is then washed and dried.

Green Proofs.—The red proof is plunged for half a minute into nitrate of cobalt; it is withdrawn but not washed. The green colour is developed by holding the proof to the fire. It is fixed by placing it for a few minutes in a solution of sulphate of iron at 4 per cent., acidified with 4 per cent. of sulphuric acid. It is then washed and dried.

Violet Proofs.—The paper is prepared as above with nitrate of uranium. On taking it from the camera it is washed in warm water, and the colour developed by chloride of gold.

Blue Proofs.—The paper is prepared with red prussiate of potash at 20 per cent, and dried in the dark. The proof is withdrawn from the camera as soon as the insolated parts acquire a bluish tint; it is then placed for five or ten seconds in a solution of bichloride of mercury, afterwards washed in water, and then treated with a warm solution of oxalic acid, washed three or four times and dried.

PEOPLE ON THE MOON.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—A paragraph appeared in your issue of the 17th of March, in which it is stated that an Italian, after six years' labour, had, by means of photography, and the microscope, been enabled to see animated beings on the moon—and that some of these beings approach the human shape, and go unclothed. That people on the moon—if there be any—should go unclothed, is no remarkable phenomenon, inasmuch as about *one-half* of the people on this earth wear little or no apparel. The first impression that would strike the minds of the majority of your readers on running over the paragraph referred to, would be that it is a hoax—a sort of repetition of the extraordinary moon story of about twenty years ago. Those of your subscribers who know anything of the telescope, of photography, and of the microscope, would perhaps not be quite so incredulous. I remember, two years ago, mentioning to a friend the probability of small objects on the surface of the moon being rendered visible by means of the telescope, photography, and the microscope. This week, during a conversation with one of the most eminent physicians in Newcastle, I found that he had, three years ago, expressed a somewhat similar opinion. To hope to see small objects in the moon by means of the telescope *only*, seems to me to be "hoping against hope." One thousand is about the highest magnifying power a telescope will bear, and it is equivalent to looking at a lunar object 240 miles distant, a distance at which an object 250 yards square would appear about one-eighth of an inch in diameter. Immediately on reading the paragraph to which I have referred, I made the following calculation. The moon is 240,000 miles from the earth; a telescope with a power of 1,000 will present objects on the surface of the moon as if they were 240 miles distant. If it be practicable to take a photograph of the moon, through the eye-piece of a telescope, magnifying 1,000 diameters, and there be applied to that photograph a microscopic magnifying power of 1,000, which is far from being the highest power used, then objects on the moon will present themselves to the microscopic observer as if they were only 422 yards distant, a distance at which small objects, such as a man or any ordinary-sized animal, might easily be recognised and the general contour perfectly distinguished. The only important practical difficulty is to obtain a clear photograph through a powerful eye-piece, and if your skilled photographic readers can assure me of this, I'll undertake to show, with distinctness, objects on the moon a trifle larger than a rat.—I am, yours respectfully,

T. P. BARKAS.

Photographic Societies.

PHOTOGRAPHIC SOIRÉE AT THE MANSION HOUSE.

THE Blackheath Photographic Society's soirée, or rather the soirée given by the Lord Mayor to the society at the Mansion House, came off on Friday evening, and was a most decided success. The company present were by no means all photographers; among them we observed many scientific men of high repute, members of parliament (who must have found it infinitely more agreeable to be enjoying the hospitality of the Mansion House, and admiring some of the finest photographs we have ever seen, than listening to dull speeches in the other house), as well as most of the civic dignitaries.

The company, on arriving at the Mansion House, were introduced to the Lord Mayor, the Lady Mayoress, and the President of the Blackheath Photographic Society (Mr. Glaisher, F.R.S.), after which each individual was at liberty to wander about the Egyptian Hall and adjoining apartments, and admire the numerous beautiful photographs suspended along the walls, and the no less interesting pictures in the stereoscope. The hall was most brilliantly lighted, and the animation imparted to the general aspect of the company by the presence of ladies in gay dresses, which, owing to the present fashion, were seen to great advantage, made it one of the prettiest sights imaginable. Add to this the charm of music at short intervals, and an abundant supply of delicacies for the restoration of those whom enthusiastic admiration of Delarue's wonderful stereogram of the moon, Glaisher's photographs of snow crystals, Williams's portraits, and other pictures, had somewhat exhausted, and it will easily be understood that the whole affair was as well conducted and agreeable as possible. The number of guests present was not so great, although we imagine there must have been nearly a thousand present, but that everybody was able to circulate with ease and comfort—no unimportant ingredient in contributing to the pleasure of the evening.

as all who are in the habit of attending evening parties will readily admit.

The advantage of meetings of this kind in establishing friendly feelings among photographers is too great and evident to be disputed: more especially when they are attended with so many agreeable accessories, which, thanks to the Lord Mayor, rendered this the most delightful photographic soirée ever given.

The French Photographic Society.

The chair was taken at the last meeting of the above Society by M. Regnault, its president.

After the names of the newly elected members had been read, the Chevalier Dubois de Nehault presented a picture to the Society. M. Laulerie presented, on the part of M. Gabriel de Rumine, a series of pictures taken by him in his journey with the Grand Duke Constantine. M. Delahaye presented, in the name of M. Severin, of Dusseldorf, several portraits of large dimensions, taken with one of Voigtlander's lenses. M. Bernard also presented some pictures.

A letter was then read from M. Lenoir, on the subject of linseed for removing silver stains from the fingers. He had tried it in all kinds of ways, and pronounced the whole thing to be a humbug; an opinion in which several members entirely concurred.

A note was then read which had been forwarded to the Society by M. Jobard, of Dijon, on a new process for fixing positive proofs, which is as follows:—

"The proof once taken is placed in a neutral hyposulphite bath, composed of 20 parts to 100 of water, and left in it about twenty minutes; then washed, and, when dry, placed in a bath composed of 3 parts of bromide of potassium, 2 of iodide of potassium to 100 of water, and then dried.

"Up to this time the proof has not changed in tone. To tone it, it is placed in a bath composed of 15 grains of sel d'or to a little less than a quart of water; the toning proceeds then rapidly, passing from red to brown, then to violet, and finally to an intense black; but the action may be stopped at any moment, and the proof is perfectly fixed.

"Two proofs obtained in this way, which have remained exposed for the last eight years, in an open gallery, to all the vicissitudes of temperature, damp, cold, and tropical heats, have remained unaltered, while other proofs fixed and toned to a black by the ordinary process, have completely disappeared.

"Proofs fixed by the new process have resisted the vapours of hydrosulphuric acid."

The thanks of the Society were accorded to M. Jobard.

The following note from Mr. Maxwell Lyte was then read:—

"I believe that in all the examinations that have been hitherto made on the alterability of the positive proof, two causes which may often account for the alterability of the proof have passed unnoticed. The two causes I refer to are:—1st, the presence of a trace of a salt of copper in the nitrate of silver bath, on which the paper is sensitised; and 2nd, the presence of chloride of sodium or some other soluble chloride which remains in the proof after it is finished. I think that the presence of these two bodies suffices to explain the numerous difficulties which photographers have experienced hitherto, and which have almost made them despair of arriving at a complete permanency. When a sheet of paper has been sensitised on a nitrate of silver bath, containing a notable quantity of a salt of copper, it is first found that the proof is slower than ordinary in printing, and, if the copper was in large proportion, that on removal from the printing frame it is dull and dead; by leaving it for some time in a humid atmosphere, it begins to fade, and loses its half-tones, and finally, on putting it in the hyposulphite, it almost entirely disappears. The destructive effect is not confined to this proof, but communicates itself also to the hyposulphite, which thus acquires the property of destroying other proofs, even those which do not contain copper.

"As to the chlorides they are still more redoubtable, since they are not only largely scattered throughout nature, but are found in most spring waters; besides, as they are colourless, they are not visible to the sight. I had never thought of this course of instability until it occurred to me in my process of printing with the phosphate of soda. I had printed several proofs by this process, and had fixed them with phosphoric acid according to the method previously described; but, having washed them in spring water, I dreaded the precipitation of salts (carbonate or chloride) or silver in the proof, and to assure myself that they were perfectly fixed, I passed them in a bath of ammonia, then dried and put them aside to tone them with gold. Having one day taken one of these proofs, I held it before the fire, and I saw the red tone it had at first gradually change to a sepia; on warming the other proofs they likewise changed. This change was not only remarkable from the fact, but still more by its intensity, and I flattered myself that I had found a method by means of which I could dispense with the toning bath. These proofs were sized the same evening, but, to my great surprise, I found on the following morning that they had almost entirely faded away. Believing that this effect was produced by impurities in the paper or the size, I sized others on paper of which I was sure, and with dextrine which I had often used on previous occasions, but always with the same result, and even on sizing a proof on a glass it faded in the same manner. A proof being cut up in several pieces, one part was well washed in distilled water, another in spring water, and a third placed in a damp atmosphere. Of these three, the two first on drying remained perfectly stable, but the third lost its vigour; and another piece, that I had placed in a damp place, began likewise to fade. It was, therefore, evident to me that the destructive agent could not exist in the washing water, nor in either of the other baths except the ammonia one. I had often used ammonia without meeting with a similar occurrence. I then examined the solution of ammonia, and, on evaporating a drop on a platinum plate, I obtained a residue which completely disappeared on continuing the application of heat. A more complete examination satisfied me that this residue was chloride of ammonium. A proof was then cut in two, one part washed in distilled water, and the other in water containing a very small quantity of chloride of ammonium. On drying these two pieces before the fire, the first retained its red tone, while the other toned to a sepia, and on exposing these to damp, the first did not change, while the other faded considerably. Experiments made with chlorides of sodium, potassium, and calcium were followed by the same results.

"From this it follows that the presence of chlorides in the positive proof is very dangerous; we ought, therefore, to take every care to avoid any trace of chloride in the last washing water. Nevertheless, the proofs toned in the gold colouring bath do not so easily part with their vigour under the influence of chlorides. Hence, we ought always to use a gold bath for colouring our proofs.

"In seeking to form a theory on this interesting subject, it is necessary to consider the following facts, in order to determine, as speedily as possible, the destruction of the proof by the presence of chlorides. It is necessary, in the first place, that it should contain only silver, then that it should be frequently exposed to hygrometical changes, by removing it from a damp to a dry place and *vice versâ*. The acids, or their vapours, appear also to assist the toning of proofs, and a great quantity of water, especially if it be alkaline, retards the action. Hence, it may be supposed that the chloride on drying attaches itself to the silver composing the proof, which is thus converted into sub-chloride of silver, with a liberation of alkali. This explains the change of colour on drying the proof before the fire. The proof is then exposed to humidity, and the alkali finding itself free becomes deliquescent, and at the same time absorbs the carbonic acid of the atmosphere; the liquid thus formed still dissolves, perhaps, carbonic acid in excess. Two affinities then begin to act. The sub-chloride of silver, tending to absorb chlorine, becomes chloride of silver, and on the other hand an alkaline chloride is formed by the affinity of the carbonic acid for the alkali. These two forces acting together determine the decomposition; on drying and again exposing the proof to humidity, the same reaction is repeated until the entire proof has vanished, the whole being converted into chloride of silver, or the chloride of sodium being exhausted. We see, at the same time, that the chloride of ammonium (since the ammonia is liberated and escapes as a gas) should produce this effect of toning more strongly than the other chlorides.

"As to the question of copper in the nitrate bath, I think that its destructive action may be attributed to a similar cause, in that the chloride of silver of the proof, by dissolving in the hyposulphite of soda, gives birth to chloride of sodium, and this, with nitrate of copper, gives nitrate of soda and chloride of

copper, which chloride is very powerful in its destructive effect, and decomposes the silver of the image with formation of sub-chloride of silver, which afterwards decomposes and partly dissolves in the hyposulphite of soda in proportion as it forms. The alkaline chlorides are not the only ones to produce the reaction of which I have spoken above; the same effect is produced with several others, if not all the chlorides, such as, for example, those of copper, iron, mercury, cobalt, &c.; but these are not so much to be dreaded, for they are not often found in ordinary springs, and even when they do exist there, they are easy to be distinguished."

M. Girard made some observations on this paper. Relative to the first point mentioned by Mr. Lyte, he thought that if the presence of salts of copper in the nitrate of silver bath hastened the alteration of the proof, the cause ought not to be in the nature of the base, but in the neutral state of the salt of copper., It was known that the salts of copper always presented an acid reaction; and that from that circumstance they appear perfectly capable of producing the decomposition of the hyposulphite. He saw a proof of the reality of this hypothesis in the alteration that the presence of these salts led to in the hyposulphite bath.

As to the second point, it appeared difficult to explain it in the present state of photographic chemical knowledge. Therefore it seemed to him that new experiments should be made, and that Mr. Lyte was better qualified than any other person to carry them out satisfactorily.

The thanks of the Society were awarded to Mr. Lyte for his communication.

M. Davanne then made a communication on the subject of Mr. Young's experiments.

M. Bertoch made some observations on a new arrangement of the diaphragm, invented by M. Voigtlander, which he characterised as being of great value to photographers.

A paper on the subject of the stereoscope, by M. Claudet, was then read.

M. Humbert de Molard exhibited two models of a new kind of expanding camera, constructed by M. Relandin, after designs by M. Davanne.

M. Vital Boujut presented the Society with an apparatus he had invented, the object of which was to produce graduated grounds on positive proofs.—*Condensed from the Bulletin of the French Photographic Society.*

Meeting of the Manchester Photographic Society.

At the last meeting of this Society, Mr. Sidebotham, the Chairman, claimed for Mr. Dancer the merit of having been one of the first to practice micro-photography, he having taken some daguerreotype pictures of this kind so long ago as 1839. In the following year he publicly illustrated his method of proceeding at a lecture delivered at the Liverpool Mechanics' Institution; he also employed the solar microscope for taking photographs of sections of wood and fossils. From the impossibility of viewing micro-photographs on silver plates with a power exceeding twenty diameters, Mr. Dancer laid it aside until the discovery of collodion, when he resumed his experiments, and produced some wonderfully minute specimens, some of which were in his (the Chairman's) possession, and others had been forwarded to Her Majesty, while a considerable number were in the hands of opticians, both in this country and on the continent.

The members were enabled to judge of the minuteness of Mr. Dancer's specimens, several being placed on the table for that purpose; among others, a micro-photograph of two pages of a book, containing 3631 letters, covering only $\frac{1}{1000}$ of an inch.

Mr. Dorrington read a paper on printing glass transparencies, the joint production of himself and Mr. T. H. Nevill, by a process which Mr. Sidebotham characterised as a very good one, he having tried the plates, and found them more sensitive than collodio-albumen. Mr. Pattison showed some pictures taken by him with dry collodion on gelatine.

Mr. Parry mentioned that he had written, in faint letters, on the collodio-albumen plate with a blacklead pencil, and found that the letters developed very black and sharp.

Mr. Mabley called the attention of the meeting to a circumstance which he considered rather curious. He coated a prepared collodio-albumen plate with collodion, in order to take a picture by the wet process, and after exposing and developing, he found that the picture came out with great intensity. He afterwards removed the collodion from the albumen surface, coated it afresh, exposed, and developed it, and, rubbing it off again, found no traces of a picture in the collodio-albumen film.

North London Photographic Association.

The proceedings of the above Association at their last meeting were confined almost exclusively to the business of the Society. The annual report was read, which gave a favourable view of its financial position, and congratulated the members on the unanimity and good feeling that had existed among them during the past year.

The thanks of the Association were given to Mr. Moon on account of his past services. He retires from ill health.

The following gentlemen were re-elected:—C. Woodward, Esq., F.R.S., J.P., President; G. Shadbolt, Esq., Vice-President; D. W. Hill, Esq., Treasurer; J. Barnett, Esq., Honorary Secretary; after which the other officers were elected.

Mr. Hislop exhibited a lantern made from his design for illustrating lectures by means of transparent glass pósitives, &c., and read a description of it.

The business of the evening was closed by the thanks of the Association being voted to the officers for their services during the past year.

Liverpool Photographic Club.

The discussion at this meeting was opened by Mr. Forrest, who expressed his obligation to friends who had suggested the use of mercury for increasing the intensity of the photograph. He found that this metal induced a ready deposit of copper from the battery, but there was a difficulty in marking its half-tones more strongly, as well as in delineating delicate photographs. He tried to obviate these difficulties by surrounding the picture with copper wire, and was inclined to think that this would facilitate the deposition.

Mr. Leithead suggested that tin-foil would be a more ready conductor of the weak galvanic current.

Mr. Corey thought that a more ready susceptibility of the surface to receive the effects of the current was what was required, and not a more subtle means of inducing a current. The application of mercury facilitated the formation of the copper film, at the same time that it intensified the image. In electrotyping, certain portions of the object to be coated repelled the metal, and it was the practice to wash those portions with a solution of proto-nitrate of mercury, and he suggested its employment in a similar manner in the present case.

Mr. Dutton observed, that as grape sugar and essential oils reduced silver in its metallic form, they might be used to throw down copper upon the surface of the glass.

Mr. R. Cook suggested the application of phosphorus dissolved in bisulphuret of carbon, to facilitate the deposit of silver; but—

Mr. Keith did not see the use of a method which, by throwing a film over the whole surface of the plate, would obscure both lights and shadows.

Mr. Corey thought that Mr. Cook's idea might lead to the abandonment of the battery altogether. He had a negative, taken five years ago, when he and Mr. Berry were working together, which the latter gentleman, finding too weak, had, after it was varnished, washed with an alcoholic solution of chloride of gold, and then blackened with sulphide of ammonium. He was of opinion that this would give the intensity Mr. Forrest wanted, and would willingly lend him the negative —an offer Mr. Forrest accepted, and promised to report the result he obtained at the next meeting.

Mr. Doyle produced specimens of what he called chromatypic printing. It was based on Mr. Hunt's process, but differed from it in sundry respects. He did not, however, give the full details of the process.

The Rev. T. Banner described a contrivance of his for sensitising and developing stereoscopic plates in the open air; which consisted in arranging a shelf, at a certain distance down the camera legs, from which a covering of black velvet extended over the top. A glass eye-piece was fitted in it, as well as a glass window, the hands of the operator passing through sleeves surrounded with elastic at the wrist, in the ordinary way in such apparatus.

Miscellaneous.

The "Drunk and Disorderly" Portrait Gallery.—We have recently heard that it has been suggested to more than one of the metropolitan magistrates, that instead of fining persons for being "drunk and disorderly" the small sum of five shillings, that it should be raised to ten shillings, devoting the extra five shillings as a salary to a photographer, who should be attached to the police office to take the portraits of the offenders, and that these copies should form the "Drunk and Disorderly" Portrait Gallery. We are unable to say whether this movement is prompted by a Maine Law Alliance man or not. Should the suggestion be carried out, it will be a rather awkward one, as it will be useless on the part of those who offend to give a wrong name to prevent exposure in the newspapers, when such a truthful description as a photographic portrait is taken.

Is the Planet Mars Inhabited?—The opponents of the doctrine of the plurality of worlds allow, that a greater probability exists of Mars being inhabited than in the case of any other planet. His diameter is 4,100 miles, and his surface exhibits spots of different hues—the seas, according to Sir John Herschel, being *green*, and the land *red*. "The variety in the spots," says this astronomer, "may arise from the planet not being destitute of atmosphere and cloud; and what adds greatly to the probability of this is, the appearance of brilliant white spots at its poles, which have been conjectured, with some probability, to be snow, as they disappear when they have been long exposed to the sun, and are greatest when emerging from the long night of their polar winter—the snow-line then extending to about six degrees from the pole." "The length of the day," says Sir David Brewster, "is almost exactly twenty-four hours—the same as that of the earth. Continents, and oceans, and green savannahs have been observed upon Mars, and the snow of his polar regions has been seen to disappear with the heat of summer." We actually see the clouds floating in the atmosphere of Mars, and there is the appearance of land and water on his disc. In a sketch of this planet, as seen in the pure atmosphere of Calcutta, by Mr. Grant, it appears, to use his own words, "actually as a little world," and as the earth would appear at a distance, with its seas and continents of different shades. As the diameter of Mars is only about one half of that of our earth, the weight of bodies will be about one half of what it would be if they were placed upon our globe.—*Curiosities of Science.*

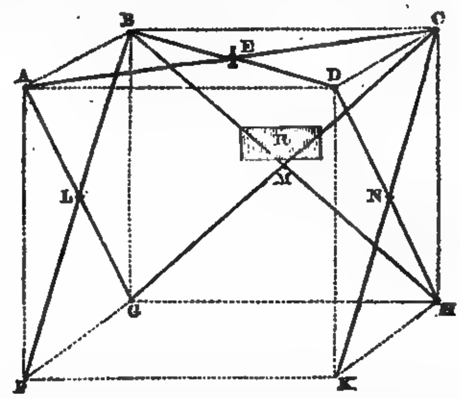
Photographic Notes and Queries.

HINTS ON POSITIVE PRINTING.

Dear Sir,—It has often occurred to me that a hint might be borrowed from the process of calico printing which would be applicable to photographic printing. If a "mordant" could be fixed in the pores of the paper by the action of light, and, after insolation under a negative, that portion of the mordant not acted upon washed out, and the paper then passed through a colouring bath, and the colour extracted from the unmordanted portions, we should get a positive print which I conceive would be permanent. One mordant alone would suffice—the acetate of iron—to give various shades of colour, in a bath of madder, from black to violet, according to the strength of the mordant. The objection would be, I imagine, that the paper would hardly bear the repeated washings; but there is a fabric called, I believe, satin jean, on which may be traced the finest lines with a pen and marking ink; now this fabric would bear boiling and bleaching. The processes of carbon printing are, in fact, the fixing by light of a kind of mordant, which renders the vehicle for the colouring matter insoluble in water. I have no time to experiment on the subject; but your intimate knowledge of chemistry will enable you to judge at once if the process I suggest would be at all feasible. In all probability, the same thing has occurred to you long since. Thomas Barrett.

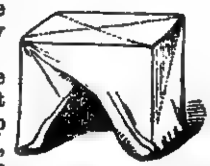
IMPROVED PORTABLE TENT.

Sir,—Like your valued correspondent "H. S. I.," I have tried not a few tents and developing boxes. As the subject of portability is one of such importance to lovers of the picturesque, I have taken the liberty of sending you a description of a tent I have constructed, and found very useful, and extremely portable.



A G, B F, are two iron rods about the thickness of a stair-rod, and 4 feet 6 inches long, they are riveted together at L so as to form a cross. BH, CG, CK, DH form two similar crosses; these three crosses are bound firmly together at B, C, G, H, with well waxed whipcord; the tops of the rods AG, BF, CK, DH are flattened, and made into a loop thus—

AE, BE, CE, DE are somewhat thinner, and looped at both ends; the rods at A, B, C, D are thus looped together, the loops acting as an universal hinge. A screw passes through the other ends of these rods at E, and they are fastened tightly by means of a nut. The covering is sewn strongly to the framework at A, B, C, D. I have found it an advantage to sew a small piece of leather at each corner of contact with the framework. Entrance is gained by means of a double curtain, thus—



Suppose the view taken, and the tent to be removed; unscrew the nut at E, the four rods forming the top then fall into the angles of the tent, and the whole will close up together by means of the pivots at L, M, N; the covering naturally falls round it like an umbrella cover. It is as well to have the cover about 6 inches longer than the framework, to allow it to lap over on the ground. The light I use is a piece of yellow calico, covered on both sides with oil-skin, about the size of a stereo-plate, let in at the back (as R).

My stereo bath I suspend from the angle at M, my developers in a little pouch at N, and my plate box (12 plates) at L. I may observe that I pack all my apparatus for taking a dozen stereoscopic pictures inside my camera, which has a leathern handle at top, and acts as a box. I take my tent and legs in one hand, and the camera in the other, strap my water bottle (India rubber) on my back, and feel moderately independent.

Allow me to take this opportunity of thanking you for your admirable "Lessons on Colouring," which have been of much service to me. F. R. E.

QUERIES ON DRY PROCESSES.

Sir,—I have been working the collodio-albumen process, as described by Mr. Sidebotham in a previous number of your paper.

Up to the fixing or last washing all goes on well; but in one or other of these last processes almost invariably the film cracks in every direction, entirely spoiling the picture. The

cracks are hardly of the nature of blisters. Can you suggest the cause, and what is of more importance to me, a preventative to any recurrence of these.

I have taken every possible precaution in drying the plates thoroughly by heat, both before collodionising, after albumenising, and before sensitising for the second time.

I have also allowed the collodion to set at least one minute before sensitising. I have been using the alcoholic collodion advertised for dry processes.

It seems strange that not the slightest indication of cracks or blisters should appear until the final step has been taken; it certainly is annoying to see a picture develop perfectly and then ruined.

I have now about 40 plates ready for the second sensitising, but I dare not finish them until I know whether it be possible to preserve them from the fate of their predecessors.

I find the plates not nearly so sensitive as stated by the Manchester Committee—frequently requiring four or five minutes' exposure.

Do you consider the metagelatine process a certain one? I have seen such excellent pictures taken by it, that if its certainty were equal to that of collodio-albumen, I should much prefer it. Are blisters and cracks as frequent in it as in the collodio-albumen? Whence arises the uncertainty in any of these preservative processes—say the metagelatine? Is it due to the *collodion, bath, or manipulation?* Mr. Cleaver tells us that he has taken 15 good pictures in one day with 15 plates, and 17 next day out of 18. I have seen some of these, and they are the finest specimens that ever it was my lot to witness.

If he can do this with certainty almost absolute, how is it that another out of 18 plates will have 17 failures, although following his instructions with the greatest exactness? PHOTOS.

[The points touched upon in our correspondent's letter seem to us of such importance, that we think it better to publish his queries in full, and ask for information from those who may have specially considered the process, than to give him an answer in our "Answers to Correspondents."—ED.]

APPARATUS FOR WASHING POSITIVES.

SIR,—I have lately had in use a simple and inexpensive apparatus for washing positive prints, and find it to answer the purpose admirably; it consists of a deal box eighteen inches square by five inches deep, with rests two inches from the top to support a board perforated with small holes. The bottom is made of very coarse linen, and the whole mounted on four legs three inches high. The prints are placed on the linen bottom, and the perforated board on the rests, when it may be put into the sink and the water turned on it. I generally contrive to put my prints there in the evenings, so that it may be at work all night without the interference of any inquisitive persons. I think parties who (like myself) dabble in photography, and have found the inconvenience of not having a running stream near at hand, will find this a first-rate substitute.

My thanks are due to your valuable correspondent at vol. i. p. 86, for his description of positive printing; since using that method, I have not had one spoiled print, except through carelessness, which I, in future, intend to avoid.

W. HAYES.

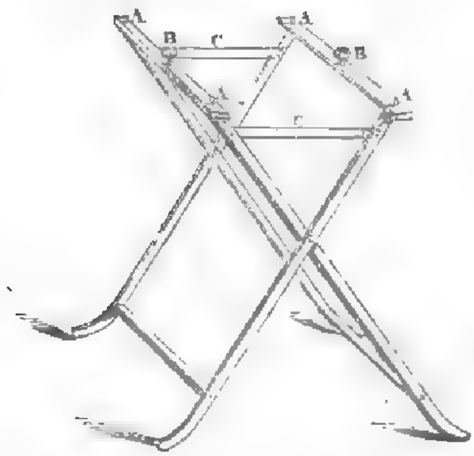
ACETIC ACID IN THE NITRATE BATH FOR POSITIVE PRINTING.

SIR,—Permit me to add the testimony of my experience to that of your correspondent "Θ" in a recent number of the "PHOTOGRAPHIC NEWS," that acetic acid, added to the nitrate of silver bath for positive printing, *does not produce spots*, or any other kind of discolouration. During the last eighteen months I have sent out many thousands of prints, which, for the purity of the whites, and freedom from discolourations of any description, cannot be surpassed, and my silver solution has almost invariably been acidified with acetic acid. If spots appear let the operator seek elsewhere for the cause, for certainly the fault lies not in the acid. Purity and suitability of chemicals are, doubtless, of great importance—so, also, is intelligent care in their use—and if some of our brother photographers would learn to question their own capabilities, it is just possible they might find out that most of their mishaps and failures arise from their own careless manipulation, rather than from any fault in the chemicals employed. THOMAS J. BARNES.

PORTABLE STAND FOR A DEVELOPING BOX.

SIR,—In vol. ii. p. 23, a correspondent, "P. F. P.," inquires about a strong stand for a developing box.

I have tried several, but found all vibrate too much to work with comfortably; and having made a light stand (though not so portable as to pack up in the box), I beg to forward a sketch of the same, hoping it may be of service to "P. F. P." and others.



Uprights of beech, 1 × ¾ inch × 3 feet 4 inches. Cross rails at top, 1¼ × 1 inch, thinner on one edge. Cross rails at bottom, ½ × ¾ inch. C C two pieces of webbing. A A A A four studs to fit into bottom of box. B B, two thumb screws to pass through bottom of box into stand, which has brass plates to receive them. Width of stand at top, 9 inches; at bottom, 15 inches.

When folded, it can receive the folding camera and tripod laid in between. It may be carried in a bag to fit.

M. D.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

SIR,—One of your correspondents H. T. (M.R.C.S.), is annoyed at his white varnish destroying his collodion pictures. One of the causes is the presence of ether; and another, the alcohol being too strong. The remedy is—to dilute the varnish with ordinary spirits of wine.

J. I. MAGINN.

THE RASPBERRY SYRUP PROCESS.

SIR,—Would "M. P. M." kindly do me, and many others, a great kindness, in stating how he made the raspberry syrup process answer? I have tried several times, but in vain; nothing ever appeared on development. J. C. S.

ANSWERS TO MINOR QUERIES.

ADHERENCE OF THE VARNISHED NEGATIVE TO THE POSITIVE PAPER.—*W. S.* has left two valuable negatives out of doors printing, and on unscrewing the frames he found the paper so closely adhering to the negatives that they would not part without detaching the varnish. The varnish was of a good French make, and the paper was quite dry. As a preventative, we advise that the nega-

tives, after being varnished, be exposed to the full sun, or kept in front of a fire, protected from dust, and at a temperature of about 120 degrees for a few hours; when quite cool, the varnish will be found to be hard. If any of our correspondents are unfortunate enough to have such a thing happen, they must never attempt to separate the paper and negative by pulling; that is the worst thing they can do, and the destruction of the picture will be the almost certain result; the best thing will be to immerse the negative and paper in hot water, and in a few hours the paper will be sufficiently softened to be removed without difficulty; if, however, it still adheres, remove it from the dish, and having placed it on a levelling stand, pour over it a solution of oxide of cuprammonium as described in a recent number, and in a few minutes the paper will be dissolved, and the surface of the negative may be cleaned by gentle friction; wash it well and dry.

Hanging up Prepared Paper.—*A. Been* has found great inconvenience in the talbotype process, owing to the iodised paper, after long soaking, becoming too tender to admit of its being hung up by pins or clips at the corner in the usual way. The best plan for our correspondent to adopt will be to dry the sheets between blotting paper, and then, having fastened two strings across the room about 8 inches apart, place a sheet of clean blotting paper over these, and on this the iodised paper: this plan is preferable to hanging it direct over the string, as the latter is liable to produce a mark.

Preparation of Calotype Paper in Large Quantities.—*D. A. Smith.* Perhaps the following plan, which has been for some time past in use amongst the calotypists of America, will be of service to you:—Provide a piece of deal board of the width of the paper to be prepared and six or eight feet in length. Pin the paper to this board with silver pins to its entire length, letting the edge of each piece underlap the foregoing one about the eighth of an inch. Place the board in an inclined position, and with a flat, soft, broad brush, lay on the first solution of nitrate of silver, beginning at the top and proceeding carefully and lightly downwards, taking all precaution that the entire surface of the paper be evenly and thoroughly wetted. Now incline the board with its edge downwards, that the superfluous moisture may run off and leave the paper to drain and dry. As soon as it is quite dry lay on the solution of iodide of potassium in the same manner; when the paper is again half dry it must be taken from the board and dipped into or floated on water, taking care that no air bubbles intervene between the prepared side of the paper and the water. After soaking for the requisite time the sheets must be fastened with a pin by one corner to some projecting shelf, suffered to dry, and then put away for use. The whole of this process must be conducted in a *dark, cool* room. Neither in this nor in any subsequent part of the proceeding should the paper be touched either by wiping or with blotting paper, for such would disturb the surface and leave marks which will be sure to appear subsequently.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Thermography.—Articles on *Radiant Heat*, by M. Melloni, are to be found in Taylor's "Scientific Memoirs," part 1, pp. 1. 39, part 2, p. 235, part 3, pp. 383, 388; and an article on the *Polarisation of Heat*, by the same author, in "Scientific Memoirs," part 6, p. 141.

Anxious Inquirer.—1. We do not think that the fault originally lay in the bath at all, but, rather, in the collodion or developing solution. Now, however, the alternate doses of ammonia and acid to which you have been treating it, are sufficient to injure a bath of the strongest constitution. You should never add ammonia to a bath; but if it requires to be neutralised, do it with solution of pure carbonate of soda. In the present instance, if you get no better results on changing the developing solution or collodion, try the effect of *sunning* the nitrate bath, and if that proves ineffectual, make a fresh one. 2. See vol. i. p. 24. 3. It should be cleansed by a professional photographer, as it is an operation requiring great skill and experience.

W. H.—We have never had an opportunity of trying the lenses you name.

H. Patey.—Strain it *well*, and it will not be of much consequence if a little of the germ has got into the albumen.

H. A. W.—Your collodion residues contain too little ether; and, possibly, water has been absorbed from the atmosphere. Add a mixture of 6 parts pure ether and 1 of absolute alcohol, in small quantities at a time, trying the effect at each fresh addition by taking a picture. In this way you will, most likely, avoid the parallel transparent lines.

A Constant Subscriber.—It shall be attended to.

W B. H.—Your stereogram is a very good one. We will insert your name in the next list.

F. C.—See "collodio-albumen process" in the index of our first volume.

R. L D.—1. See Mr. Heisch's corrections at vol. ii. p. 20. 2. Meta-gelatine is gelatine which has had its power of gelatinising in an aqueous solution destroyed by heating with an acid. 3. Gelatine should be used in preference to isinglass. 4. The focal point is that at which the image of the sun thrown on the sheet of paper by the lens, appears *smallest* and has the edges most sharply defined.

An Amateur.—The pinholes in the black parts of your negatives may arise from your collodion being prepared with an alkaline iodide and not having properly settled, or from the bath requiring filtering.

C. Barker.—Our correspondent has already given a detailed description of his method of working the Fothergill process, in an early number of the "News." See our first volume. 2. We will give full particulars in an early number. 3. Yes; but better methods have been already described in our first volume.

B. and W.—Received.

Diddle.—1. Pouring the developing solution too much on one part of the plate is the most likely cause for the transparent patch which you describe. 2. We do not recommend it on our own authority. 3. We are very well pleased with the working of the lenses you name; more than this we cannot say. 4 and 5. Send an addressed and stamped envelope, and we will give what information we can.

W. A. Thompson.—The negative from which your picture was printed is a very fair specimen of the process. The printing also is very good, but would have been better if it had been a little warmer in tone. It would be as likely to be as permanent as any similar process.

G. N. D.—We are much obliged for your interesting communications. Your pictures are equal to the average, but might still be a little improved. They would mostly have borne longer exposure, and we also think that the printing process hardly renders them with sufficient vigour.

X. Y. Z.—Received.

Muddle.—We can only suggest that the bath is too acid; remedy it by adding carbonate of soda, in sufficient quantity to make it *quite* neutral.

Beta.—See opposite.

E. J.—1. You can easily find what you want by referring to the index of our first volume. 2. Fifty grains to the ounce will be preferable to adopt when no particular strength is mentioned.

W. L. M.—Liver of sulphur can be purchased at the druggists. Your crucible was not heated sufficiently; powder the fused mass, mix it with its own bulk of dry carbonate of soda, and heat in a crucible to whiteness again, keeping up the heat for an hour.

C. G.—The substance of your communication would appear best in your proposed advertisement.

A Subscriber.—1. It will be impossible for us to suggest a more probable cause of fading than imperfect washing, unless we knew the whole particulars of the method by which the picture was printed. 2. We cannot answer for the efficiency of all the articles advertised in our columns. We prefer Taupenot's process. 3. An expanding camera.

A. Nelson.—Received.

W. S.—1. Answered above. 2. Wash twice for about half a minute, taking for a stereoscopic sized plate about ½ an ounce of water. Your picture would have been improved had the exposure been longer; it is rather *hard*. 3. Allow more time to elapse between coating the plate and immersing it in the bath; this will remedy the greasiness you complain of.

Aliquis.—Maxwell Lyte's is a very good toning bath; so is our correspondent Θ's. Your cautions are very good; and we shall have much pleasure in presenting them to the photographic public.

W. R. R.—Consult the index to vol. i.

Nit. Sil.—You added carbonate of soda in too great a quantity, and thus you not only neutralised the acid, but precipitated carbonate of silver. This you should have filtered off, and then added a drop of glacial acetic acid to the clear solution.

****.—See answer to W. R. R.

G. H.—Rinse your bath out first with alcohol, then with cyanide of potassium, and, lastly, with one part of strong nitric acid and three of water; afterwards well wash, and it will be fit for use.

J. G. D.—Our correspondent should have mentioned the subject before. As it is, the credit of first publication is decidedly due to Mr. Rump. However, we cannot believe a true photographer is actuated by any other motives than a desire to benefit his fellow-labourers in the art, and we will therefore gladly give "J. G. D." an opportunity of communicating his experience with saccharo sulphate of iron as a developing agent, if he will favour us with particulars.

M. Henry.—1. Your toning bath is evidently at fault; either the chloride of gold is impure, or the formula not good; try Maxwell Lyte's, or the one recommended by Θ in a recent number. 2. We do not observe the stain you mention. 3. Your description is that of a good negative rather over developed.

Amateur.—1. The collodio-albumen process. 2. Aplanatic.

W. G. G.—The price is 1s. per part. We do not know the publisher, but you can get it through any bookseller.

Colon.—1. We will consider about it. 2. The reason is not very exactly known. 3. Coating a camera with white inside instead of black is attended with very great disadvantages, and we therefore cannot advise its adoption. Foggy pictures would be the certain consequence. 4. Yes; if the lids be made tight.

Henry N.—We do not think that a collodion made with good methylated ether and alcohol would be likely to injure the bath.

Enquirer v. Desparir.—1. Had you rested satisfied with the first mess you had got into, we could have helped you; the nitric acid which you spilt into the bath might have been neutralised with oxide of silver, and the bath made fit for use again. But, instead of applying at once to us for advice, you did the very worst thing in your power—added a quantity of ammonia. Your bath is now so charged with nitrate of ammonia, that nothing can be done with it. Make a fresh bath, and in future treat it with more respect. A child can easily damage the constitution of a bath in such a manner that it would puzzle twenty clever chemists to set it right again. 2. Your second failure may be remedied by using a faintly acid bath.

Communications declined with thanks:—O. U. R.—Lord F.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Pyro. G.—Cat.—Parliament.—G. U. R.—Silentia.—Photo.—An Amateur.—W. C.—L. A. M.

In Type:—Zeuxis.—A Kerry Man.—Beta.—W. L.—R. P. H. N.—Aliquis.—J. I. Maginn.—G. W.—T. Barrett.—J. B. Cooke.

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THE PHOTOGRAPHIC NEWS.

VOL. II, No. 34.—*April 29*, 1859.

PHOTOGRAPHS IN THE DARK.

THE EFFECT OF HEAT IN THE FORMATION OF CERTAIN PHOTOGRAPHIC IMAGES.

ON the 4th of March last we described some experiments which we had recently been making on M. Nièpce de St. Victor's "New Action of Light," and in our article (vol. i., p. 301) we gave it as our opinion, deduced from careful experiments, that radiant heat was capable of producing similar photographic effects to those which M. Nièpce obtained by means of his "stored-up" light. These opinions were further strengthened by experiments, which were described at p. 12 of our second volume. We now read that on the 7th of March last, M. Gaultier de Claubry deposited a sealed packet in the keeping of the French *Académie des Sciences*, which, being opened at the last meeting of that learned assembly, was found to contain a note, from which we extract the following:—

"The remarkable facts observed by M. Nièpce de St. Victor relative to the action of light have proved that this can, so to speak, store itself up in bodies, which are submitted, for a greater or less space of time, to its influence. Amongst them are some which demonstrate that this action is augmented by that of heat; but it does not follow from any of them that *heat alone* is capable of producing effects analogous to those of light. Gay Lussac and Thenard have shown, in their physico-chemical researches, that heat acts on certain organic substances in the same way as light. Guided by these researches, I have been led to make comparative experiments on the influence of light and heat in reproducing characters on sensitive papers, and I have obtained results which seem to me to promise success. Papers rendered sensitive by means of aceto-nitrate of silver, nitrate of uranium, or gelatine mixed with bichromate of potassa, and placed for a length of time, varying from twelve minutes to an hour, on a sheet of paper covered with printed characters, and heated to 100 to 120 degrees (212° to 248° Fahr.), furnished a complete reproduction in the case of the black ink, but one hardly sensible with red ink; a result analogous to that which M. Nièpce de St. Victor has observed in the action of light. Although incomplete, the facts which I announce seem likely to be of future interest, and I, therefore, deposit them here in order to secure the priority of publication (*dans le but de prendre date*)."

We are not afflicted with over-sensitiveness respecting any real or fancied appropriation of our own ideas by others, or we should frequently have occasion to break a lance with some of our contemporaries, and we are willing to admit that the three days' start which we have over M. G. de Claubry is the result of pure accident, and that he deserves the full credit for any originality which there may be in the discovery. Our object is to draw the attention of our readers to the importance of making known to the world, as soon as possible, their discoveries or improvements. We are daily receiving letters from persons who, having seen in our columns a description of some apparatus or improvement which they have previously found out, claim for themselves the priority of invention, forgetting that this is universally held to be decided by priority of publication. When we see our continental brethren so jealous of their fame as actually to take such steps as the above in order to secure, to so trifling a discovery, the earliest possible date, our correspondents should be similarly watchful over the fruits of their own brains, and remember that the best way to secure the credit of any discovery is to publish the account of it before any one else; not to wait till another has benefited the world by a full publication, and then to come forward stating that the same idea had previously existed in their own minds.

PHOTOGRAPHY IN THE WITNESS BOX.

THE application of photography to legal purposes is ever presenting some novelty, and certainly we may rank this as one of the wonders of the age. No reader of the law reports which abound in our daily papers, can avoid being cognisant of the immense amount of "hard swearing" which too often disfigures judicial inquiries and investigations. There can be no doubt but that in many instances we may find witnesses of the opposing sides who conscientiously narrate their own version of a transaction, and yet often differ diametrically in their tales. These discrepancies frequently arise from imperfect knowledge, or want of proper observation. It may often happen that a person is accidentally the witness of some affair which ultimately becomes the subject of a legal suit, and may feel no particular interest in it beyond a momentary inquiry, and as a matter of course cares little about the correct particulars relating to it. In time he is subpœnaed as a witness, and is subjected to a severe cross-examination, and owing to his want of proper attention at the time of the transaction he may be caught tripping and actually make admissions which he did not intend, or which are directly the opposite of the real facts. Under all the possible disadvantages of human witnesses, there can be no doubt but that it is highly desirable, whenever it is possible, to call into requisition the most truthful witness in the universe—photography; because, whatever may be the wish of an *ex parte* photographer to take photographs of things that will favour the side for which he is engaged, it is impossible for him to tamper with the mechanical witness of which he has every control except that of making it speak falsely. The most recent application of photography to legal purposes was in the notorious case of Hughes *v.* Dinorben. This was a case brought by a Mr. Hughes against Lady Dinorben for writing scandalous anonymous letters, which tended much to his injury. In the court many of the letters were produced, but to prevent the possibility of losing them, Mr. Hughes had negatives taken of each, and then he was enabled to put into each juryman's hand a fac-simile of these precious compositions. Of course there could be no objection to the reception of these copies as evidence, because they were too self-evident. By comparing the writing with some of Lady Dinorben's acknowledged writing, the jury arrived at the unanimous

conclusion that she was the writer, and accordingly gave a verdict for the plaintiff. But in another case we have a still more important illustration of photography in the witness box, to which we alluded in a former number. Very recently there happened to be a "slip," as it is technically termed, of some land, in connection with some public works. Of course the parties who had engaged the services of the civil engineers and contractors blamed them for insufficient work. As the case was one of importance and involved several thousands of pounds damage, the proprietors at once sent for an able photographer, and he, under the direction of another civil engineer, who was called upon to give his advice in the emergency, took a series of views from all parts, and in a manner to satisfy the most particular jury that ever was assembled. It will at once be seen that this was a most important step, because the proprietors were enabled to proceed at once with remedying the misfortune. Had they not availed themselves of photography they must have left the embankment in a dangerous state, hourly becoming worse, in order that a "jury of inspection" might be called upon to view and arbitrate on the matter. Besides this, another and striking advantage accrued: good and correct photographs prevented the possibility of the "hard swearing" above alluded to. Because we may rest assured that in giving evidence the witnesses for the plaintiffs would be inclined to exaggerate the damage, while, on the other hand, the witnesses for the defendants would naturally depreciate its importance; but photography happily comes in between the two and sets both sides right by giving truthful and correct information. May we not hope that the day will soon arrive when photography, wherever it can be used, will be made available for the purpose of promoting justice and equity between man and man While on this subject we may allude to another and most important application of photography. It is perhaps not, strictly speaking, a legal application of photography, though in some instances it may be so termed. We allude to a suggestion made at the annual meeting of the "Association for the Prevention of Boilers Bursting." This association originated in Manchester some time ago, owing to the great number of lives that were annually lost by the bursting of boilers in large manufactories. The association appoints several agents to inspect boilers, and to report on imperfect ones, so that they may at once be remedied. There can be no doubt but that this association has already saved several hundreds of lives, and it is to be hoped that similar associations will be formed in all the large towns, so as to prevent the great annual sacrifice of life which takes place simply for want of proper care and attention. One of the members of the association has suggested that in future, when any of these unfortunate accidents occur, there should be photographs taken of the boilers that have burst in order that a museum of such photographs might be formed, with reports showing the cause of bursting. This suggestion, we are happy to learn, has been adopted, and in future photographic copies of all these accidents will be taken, as guides and warnings to others to keep clear of what had produced the fatal result.

CELESTIAL PHOTOGRAPHY.

It will be remembered that in our 29th number (vol. ii., p. 25) we gave an interesting extract from the report of the council of the Astronomical Society, in which a *resumé* was given of the progress which had been made in the application of photography to the reproduction of celestial objects. Our learned foreign contemporary "*Cosmos*" has given the above-mentioned extract in the last number, and has added the following remarks:—The council of the Astronomical Society of London must excuse our casting on them some slight reproach. They have omitted all mention of the photographs of the eclipse of the 15th March, 1858, which M. Porro obtained with his object glass of 52 centimètres (nearly 20½ inches) diameter. These photographs would, on the contrary, have deserved serious attention in consequence of their size and sharpness, so well appreciated by M. Faye. The solar spots shown on them will bear a considerable magnifying power; in fact, their forms and dimensions admit of being very well determined and measured. The future of stellar photography lies entirely in the employment of object glasses sufficiently large to give negatives of such a size that, to obtain positives from them, any magnifying process will be unnecessary: images artificially enlarged must necessarily be less sharp; and what we ought to aspire to should be the reverse: negatives of very large area and reduced positives.

Let us hope that the talented director of the Imperial Observatory of Paris, following the steps of his illustrious friend, M. Otto Struve, and of Mr. Bond, will transform into an astro-photographic apparatus the large equatorial of 38 centimètres (15 inches) diameter, which M. Brunner has nearly erected in the large cupola of the observatory. We shall be anxious to know if the partial devitrification of the magnificent object glass of M. Lerebours has been entirely corrected and ground out—if it will again show on the surface of the moon those mysterious and unknown peculiarities which so perplexed and delighted François Arago—if, in a word, this important enterprise, continued for so many years, will be crowned with such a brilliant success that the skilful and enterprising artist may obtain at last the honourable recompense which has been promised him. Of all the members of the *Bureau des Longitudes* he alone remains undecorated.

We have also learned that M. Leon Foucault has recently put, at the Imperial Observatory, the finishing touches to the silvered glass telescope of 35 centimètres (about 14 inches) diameter, which will render good service to physical astronomy, and the more so since M. Leon Foucault is perfectly well acquainted with the resources and secrets of photography.

THE PSEUDOSCOPE.

The pseudoscope is an instrument by means of which the influence of the mind over the eye, may be to a certain extent proved. This instrument is the invention of Professor Wheatstone, and consists of two reflecting prisms fixed in a frame, so arranged that in looking at an object, either eye receives a transposed image of that object through the corresponding prism, the effect of which is that the relief of the object is *converted*, in other words, has an appearance the very opposite of that which it presents when looked at with the naked eye. Thus, an intaglio assumes the appearance of an object in relief, and a medallion assumes a hollow appearance under the same circumstances. It was observed and recorded by Aguilonius in his *Opticorum Sex Libri*, published in 1613, that at a considerable distance all objects, whether convex or concave, appear plane; and he then goes on to show that when seen at a less distance the convex surface sometimes appears concave, and the concave surface convex, that is, they are converted. He very justly attributes this to the fact that the mind is imposed upon, through not perceiving the direction from which the light falls upon it. Subsequently to this, in or about 1744, Dr. Gmelin published a paper in the *Philosophical Transactions* on the conversion of a hollow seal into a raised one. To exhibit this phenomenon more perfectly an instrument was constructed, termed a cameoscope, some of which were single and others double. The single cameoscope was formed of two achromatic lenses of short focus, placed at nearly the sum of their focal distances apart; and convex bodies, when looked at through this instrument, will appear concave, and concave bodies will appear convex; it will, likewise, affect the apparent distance of the objects from the eye. The instrument of Professor Wheatstone has, however, many advantages over this; and is essentially a different instrument, though the effects pro-

duced by it are in some respects similar; and we differ entirely in opinion with a writer in the *North British Review*, who says of the pseudoscope, "that it is a most capricious and unsatisfactory instrument, which often fails to show what it ought to show," and that "it differed in nothing from the cameoscope, excepting that the inversion of the objects and their double pictures are produced by two reflecting prisms, in place of lenses." What the writer may mean by saying that it fails to show what it ought to show, is not quite clear. If his meaning is that *all* objects when regarded through it are not converted, and, *therefore*, that it is a capricious and unsatisfactory instrument, it must be admitted that it is so in that sense. *All* objects are not converted by it, but the exceptions are very few, and form an exceedingly interesting subject for consideration. As a rule, those objects which we have never seen otherwise than in relief, as the human face for example, obstinately refuse to be converted. If we view a hollow mask we shall see it in relief without any difficulty, and this may be readily effected without the instrument, by closing one eye and looking at it fixedly with the other; but if we try to produce the opposite effect, that is, to make the outside of the mask appear hollow, we shall find it exceedingly difficult, but it is not impossible with the aid of the pseudoscope; but neither with the instrument, nor without it, can the same effect be produced with respect to the human face, except on very rare occasions. Now, after what we have stated with respect to the mask, it will be evident that there is nothing in the formation of the features to prevent the same conversion; still the mind, which is conscious that the mask has two sides, one hollow and the other in relief, and, therefore, suffers the eye to be deceived, will not suffer the eye to be deceived with respect to the human face; it cannot admit the possibility of flesh and blood undergoing such a change.

To demonstrate the inability of monocular vision to give a true idea of a solid form, Professor Wheatstone stated in one of his memoirs that if we hold a small cube made of wire or ebony-beading, and look at it with one eye closed, while changing its position by turning it between the fingers, its various perspective projections are interpreted by the mind, so long as it retains the idea of the cube, as so many different representations of the same object. But as some of these perspective projections might be given by a very differently shaped object, it may happen that one of these dissimilar figures may suggest itself to the mind, and if the idea be fixed there by looking steadily at the object for a short time, it will be very difficult to bring back the original idea so long as the position of the object remains the same. But, if the movement of the cube between the fingers be resumed while the mind is still possessed with the false idea, the series of perspective projections then presented being irreconcileable with the converse form, the mind either goes back to the original conception of the cube, or, otherwise, the skeleton figure appears to undergo a continual change of shape.

Everybody is familiar with the effects of looking at a photograph with one eye; the figures represented assume greater vigour, and even, in some cases, appear in relief. To illustrate the ease with which the single eye may be influenced by the mind, we may mention that we had placed in our hands, a paper, belonging to Mr. Malone, covered with representations of coins engraved by Fizeau's process (described at vol. i. p. 75 of this journal). These were exceedingly beautiful, and it occurred to us to hold them in such positions that, when viewed with one eye alone, they alternately assumed the appearance of a cameo and an intaglio, according to the direction from which the light was supposed by the mind to fall upon them. Other effects are produced by looking at the photograph with one eye alone beside that of relief; on this point we quote a paragraph from a recent number of the *Edinburgh Review*; it says:—"We have noticed this, especially with regard to the representation of still water, which is generally one of the most unsatisfactory parts of a photograph, for although, when looked at with both eyes, its surface appears opaque like white whey, a wonderful depth and transparency are often given to it by viewing it with only one. There exists a photograph of a part of the sands and rocks at Tenby, in which not only the rugged projections and cavernous recesses of the former, but the smooth surface and the gentle undulations of the latter, become most vivid to the single eye; whilst a small patch upon the sand, the meaning of which is not otherwise very apparent, then shows itself to be a most faithful portrait of a little pool of water lying in a hollow of the sand, and reflecting the rocks above. The superiority of monocular to binocular vision here depends, not only upon the freedom under which the mind is left to interpret the picture after its own fashion, when no longer forced to view it as a flat surface, but also upon the circumstance that the photograph taken by a single camera is really a portrait of the object as seen by one eye; and, that whilst it is the truest possible picture when viewed under the like aspect, it is not a true picture as viewed by both eyes, since not merely the apparent shape of all near objects, but the character of their services as recognised by the mode in which light is reflected from them, is sensibly different, according as either eye is used singly, or both eyes together."

A very curious effect is produced by reversing the positions of two stereoscopic pictures, placing the right hand picture to the left, and the left hand picture to the right, and then looking at them in the stereoscope. When the picture contains statues, trees, or other objects, their relative distances will be changed,—the more distant becoming near, and the nearer retreating into the background; for example, a statue, standing between or in front of a row of pillars, will appear to be at some distance behind them; and in the case of groups of statuary, the figures in the background will appear to be in front of those in the foreground, while they are shorn of those parts which are concealed in the picture by the figures actually before them. In the cases we have mentioned, the change is simply one of distance, the figures retaining the appearance of relief.

The same appearance is not presented to every individual; to some they appear confused; and the same may be said of some pictures which, when viewed in this way, cannot be made to give a satisfactory idea of the solid form.

On first looking with the pseudoscope at the inside of a basin, the eye very frequently sees it to be hollow; the mind, being so much more familiar with the interior of the basin than with its external aspect, assumes it to be hollow, and the eye sees it in accordance with this idea; but after looking at it for a time, it changes its appearance, to some persons gradually, to others suddenly, and the image is converted. Sometimes, after this is effected, the real aspect returns to the mind, but is soon banished, and the new idea takes entire possession for a time.

There is a curious optical illusion which can be produced without the aid of an instrument. The cane bottom of a chair being placed in a vertical position before the eye, and the hands being placed upon it, will, if the optic axes be directed to a point beyond the chair, become invisible; and instead of the actual bottom being visible, a phantom of it will be seen suspended in the air between the eyes and the actual object, which, together with the hands, will become invisible; so that, to use the words of an eminent writer, the observer "*feels what he does not see, and sees what he does not feel.*"

PRESERVED LIGHT.

In our last number we reproduced an article containing a summary of the objections of the "Photographic News" to the recent experiments of M. Niépce de St. Victor on the Action of Preserved Light. He has since made some fresh experiments, and embodied them in a note presented to the Académie des Sciences, in which he refutes these objections, and which we hasten to publish. This note is as follows:—

"I will reply by a single experiment to the objections which have been raised relative to the persistent activity communicated by the light to an insolated body

"I placed in an icehouse a tinned tube containing a piece of cardboard impregnated with tartaric acid. After exposure for a sufficient time to the action of the light, this tube was buried in ice for 48 hours. A piece of sensitised paper, prepared merely with nitrate of silver, was placed beneath a thin paper on which some large letters were printed, and the mouth of the tube having been uncovered, the tube was inverted over it. When I considered that the preserved light had acted sufficiently, I treated the sensitive paper with gallic acid, and developed the picture which I have the honour to present to the Academy. If the paper had been prepared with the iodide of silver, the image would have been much more vigorous; but such as it is, it gives undoubted evidence of a real action exercised by the light, without any calorific radiations, and that is all I desire to demonstrate at present.

"As to the action of heat, I know that it exists since I discovered it by the experiments I have pursued for several months past, and which I shall shortly publish, contenting myself with saying, to fix a date, that by availing myself of the obscure radiation of a source of heat at 212 degrees F., I obtained, at will, negative or positive pictures, according to the preparation of the paper. The heat may then, in certain circumstances, produce results which in my early researches I attributed to the light. The calorific and luminous radiations incontestably exercise chemical actions, but really distinct, and which must not be confounded together, even though they act simultaneously. When the tube is heated in which the light is preserved, as I advised at an epoch when the distinction between the calorific and luminous rays was not very clearly defined in my mind, a more intense and more rapid impression is obtained, because the two effects combine to produce it; but, as I have shown, light alone, independently of any elevation of temperature and the intervention of aqueous vapours, suffices to give very vigorous impressions.

"As to the objection drawn from the fact that the image is not formed through a thin glass or mica plate, I may refer to my first memoir. It will be seen by that, in fact, that this activity communicated by the light does not traverse glass, and that it is the same with luminous radiations emitted by phosphorus burning slowly in the air; these do not indeed act on sensitised paper."—*La Lumière.*

THE FOTHERGILL PROCESS.—IMPORTANT MODIFICATION.

BY MR. A. KEENE.

A CORRESPONDENT, Mr. John Draffin, in a recent number of the "NEWS" states, that after several comparative trials of the "Fothergill," "Collodio albumen," and "Hill Norris's" processes, he has decided against the first named; for, though he has obtained some excellent negatives by it, it has, in his hands, been far less sensitive than either of the other two.

Allow me to suggest that, instead of purchasing the plates ready prepared, the way to obtain correct results would have been to have prepared them himself, had he done so, with—for stereoscopic size plates—the use of four drachms of distilled water for the washing, or, more properly speaking, diluting bath on the surface of the sensitised plate, as recommended by me in an early number of the "NEWS," and also in my pamphlet, *thoroughly* washed the off albumen; placed the plates to surface dry on blotting paper upon *glass;* and, while the temperature remained under about 60°, dried them with artificial heat, not exceeding 120 Fahrenheit; at same time avoiding contact with new wood, both during and after preparation—he would not only have had no occasion to doubt the statement that, under favourable circumstances, a negative can be obtained with the minimum exposure of thirty seconds, but would have entirely altered his opinion of the comparative value of the three processes, and given the "Fothergill" the same preference as his late friend; probably writing as much in favour of it as a former correspondent in the "NEWS," who brought home about *forty* good negatives out of five and forty prepared plates, all of which, he stated, were prepared before starting on his journey, and developed at leisure on his return.

My chief object, however, on this occasion, is not so much to draw attention to the above, as to a modification of the process by which the sensitiveness is increased three or four fold, which is simply the substitution of rather thin mucilage, of white gum arabic, 10 drachms, dissolved in 5 ounces of distilled water, with the addition of 6 or 8 grains of chloride of ammonium to each ounce; the manipulation to be conducted in every way the same as before. The use of this salt is not my own idea, but was suggested by a correspondent in a contemporary, who drew attention to the great increase of sensitiveness obtained by adding it to the albumen. This I found to be the case; but a still further increase by using it with gum water, as mentioned. The development of plates prepared with gum is also much quicker. Whether either of the modifications will give the exquisite half-tone and distance of the Fothergill process, remains to be proved by experience.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

INSOLATION.

THE insolation of the chloride of silver received from us an attentive study; for, it must be remembered, it constitutes the starting point of the photographic theory. Experiment has shown us that the ultimate action of light on the chloride of silver was the separation of its elements and the production of metallic silver. If, in this case, sub-chloride of silver is formed, this never happens, except in *the transition* state, and in quantities so exceedingly small, that one must consider them as *imponderable*, and entirely incapable of producing a photographic proof. This then is formed of metallic silver, free or combined, but not by sub-chloride of silver, as has been hitherto admitted. We had already established this fact in considering the proof on withdrawal from the fixing bath, but it was essential to establish that it subsisted before this bath re-acted upon it.

We shall here relate some of the experiments which have led us to this conclusion.

Although it may be admitted, generally, that the chloride of silver undergoes, under the luminous influence, a reducing action, it was nevertheless interesting to make clearly evident the liberation of chlorine which should accompany this reduction; we easily succeeded in accomplishing this, by putting very pure and well-washed chloride of silver in suspension in distilled water, coloured either by turnsole or indigo. In both cases, at the end of some hours, the liquors were entirely decoloured by the chlorine which was liberated, and of which it was besides easy to ascertain the presence, by pouring into the solutions a drop of nitrate of silver.

This first point established, we next proceeded to examine if this reduction gave rise to sub-chloride of silver or metallic silver.

To accomplish this we spread, in exceedingly flat dishes, dilute solutions of chlorides of sodium and nitrate of silver, mingled in absolutely equivalent quantities. In a short time the chloride of silver was deposited and, thanks to its thinness, remained adherent to the glass of the dish; we then decanted and exposed the chloride in this position during several days to the solar action. The brownish precipitate thus obtained was found to be soluble in nitric acid in a remarkable proportion, with the formation of nitrous vapours; which indicated the presence of metallic silver, and the residue, scarcely tinted of a violet colour, was completely dissolved in ammonia.

Now, chemistry teaches that sub-chloride of silver is insoluble

* Continued from vol. II. p. 75.

in nitric acid, and it has been known, ever since Scheele's time, that this body is decomposed by ammonia, and gives a precipitate of metallic silver. Hence, this compound is not found in any sensible quantity in the substance furnished by the insolation of the chloride of silver, and this latter was simply formed of metallic silver, of a mass of non-reduced chloride of silver, and of a trace, inappreciable by weight, of sub-chloride.

It is the same on a proof; in fact, if we treat directly by ammonia the substance obtained in insolating the chloride of silver, we get a very important residue of metallic silver, which, if we suppose it extended on a sheet of paper, might perfectly well produce a proof, while, if we make this substance undergo the same treatment, first depriving it of the metallic silver it contains, by means of nitric acid, nothing more will be left than an inappreciable residue, scarcely tinging the liquor, and quite incapable of colouring even the little filter in which an attempt may be made to collect it.

We know, then, now the part which the chloride of silver plays in the act of insolation, it is restored to the metallic state; but, as we know, the chloride of silver is not alone on the paper where the photograph is to be formed, and among the bodies which surround it, the nitrate of silver, as we have demonstrated, plays a conspicuous part in the production of the photographic result. We will now look for the explanation of this. We have already announced the result at which we have arrived on this subject, in saying that the nitrate influences the definitive production of the proof, by supplying, in a constant manner, a new aliment to the chloride which is liberated from the reduced salt of silver; that the chlorine attacks the nitrate in contact with it, forming a new chloride which blackens and is reduced in its turn, setting at liberty a fresh quantity of chlorine; finally, in adding that the chloride of silver, finding itself thus in larger quantity on a given surface, encountering besides, in a nascent state, the luminous rays which fall upon it, is influenced by them with a greater energy.

Sundry experiments enable us to verify these assertions.

If they are true, in fact, it will suffice to take the two halves of a sheet of sensitised paper, to keep one in darkness, while the other is submitted to an energetic light which may have the power to metallise it, and to estimate the quantities of chlorine remaining in both the one and the other. If, in fact, the chlorine, in proportion as it is liberated from the combination, saturates a fresh quantity of nitrate of silver, the sheet ought, in both cases, to preserve the same quantity. This is what experiment has proved, for in the insolated half of the sheet we found nearly as possible the same quantity of chlorine as in the sheet preserved from the influence of the light.

Besides, if we place chloride of silver in suspension in a solution of nitrate of silver, and expose to the solar rays, it will be found, after it has blackened, that the liquor does not contain free chlorine, but nitric acid which reddens turnsole, which implies the partial decomposition of the dissolved nitrate of silver.

(To be continued.)

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued)*.

Eyes.—Wash in the local colour of the eyes. It will be observed that brown eyes come out almost black in photographs. Here again is a difficulty which perplexes many—to make those eyes, which in the photograph are black, to appear bright and transparent, such as they are in life. Nothing can be more beautiful than a finely painted brown eye, with its luminous colour. We have succeeded best by first washing on an opaque yellow, say deep chrome, and then glazing with burnt sienna and vandyke brown, always using gum in glazing. When the chrome is laid on, it should be tolerably thick, so as to hide the dark colour of the photograph underneath; and, when dry, the picture should be again burnished, to make this smooth previous to glazing.

If the subject has eyes in which blue predominates, the photograph will give them *too light;* this offers an advantage, inasmuch as we can get them down to any depth or brilliancy by glazing with such colours as Antwerp or Prussian blue, or, if necessary, with neutral tint, or indigo added as the case requires.

But we have always to use brighter colours than would appear correct, strictly compared with the living model, because we have a grey (the photograph) underneath, which comparatively neutralises that laid over by being seen through.

So that having washed on whatever colour is required for the eyes, the hair, the shadows of flesh, give a few minutes for drying, then burnish well again.

If the wash over the shadows of the face and hair appears dim and flat, they can be fetched up by going over them with gum or medium. This being done, take crimson lake with medium, and faintly wash on the carnation of the cheeks; also feebly go over the ears with same; to this add vermilion for the upper lip, using vermilion alone for the lower one. Give a second wash on the cheeks of lake, keeping this wash within the first, which, being lighter, will be soft. Now take, with the medium, Antwerp blue, or any transparent colour, according to complexion; with this introduce the cool greys where they are required, such as side of forehead, temples, round about eyes, corners of mouth, under chin, neck, and by the sides of all deep shadows; which you have made warm with vermilion and yellow, because flesh is always grey by the side of shadow.

If the complexion be very fair, use more of this cool grey; if warm, it will be useless, or worse, tending to blacken the effect of what follows. Use the burnisher again.

Now begin by laying the colour on in small strokes with fine sable brushes, using medium in every touch. You will now, by holding both photographs at a little distance so as to get the general impression, see that the effect of your picture is *flat* compared with the dark copy, which results from your having reduced the white lights of your picture something by the first wash, and the shadows being lighter by washing on the tint of vermilion and Indian yellow, thereby comparatively destroying the strength or force of light and shade contrast in the head, and, moreover, causing much of the modelling to disappear. You have now to recover these properties, in doing which you may produce any amount of delicacy, any complexion, any touch you please, because repeatedly burnishing upon the paper has hardened it, so as to admit of nearly the same process as painting upon ivory; and whilst working in again the anatomy of the face, you can etch on the nicest tints to resemble those of nature. Here it may be well to speak of the necessity of painting from the living model; there you have presented to you the object naturally, which you will treat, to the best of your abilities, as you see it, and not as others would, because no two painters see the same thing quite alike, and if you try too much to imitate another's method of representation, and that method not, perhaps, as you yourself would see the thing, you will not be successful even in equalling that style you are endeavouring to follow, because no one can work well against his own feelings. There is an appearance of originality and truthfulness in works by artists whose practice is to paint everything from life, which at once distinguishes them from those by painters who have rather studied the works of others than nature.

However, to proceed, it is understood that we have now laid on the cool greys in various parts of the face, somewhat in excess of coldness, because over these we now commence by etching a general colour of warmth, regulated by the complexion; if a very fair one, lake, and a little Indian yellow; if warm, more yellow, with a little raw sienna, still further to deepen the tone if necessary. Use this, in various degrees, to work in the anatomy all over the face, the fore-

head first, and afterwards the cheeks; having done which with very feeble colour, go over, when necessary, again, a shade deeper, carefully graduating the tones, so as to round up the bones and muscles softly, making the stippling so soft as only to be just perceptible. This stippling is to be in large soft strokes, only perceptible in their effect, and simply to answer for washing, being substituted as calculated to render the face uniform sooner than could be by broad washes. Where on cheeks much warmth is required, use lake and burnt sienna in finish to deepen with.

The effect of going all over the head with one general colour, and that the colour of the complexion, is to produce a breadth and solidity, at once varied in its tints from the circumstance of those cool greys and bright laky colours underneath shining through. It may be considered as equivalent to glazing in oil.

(To be continued.)

Dictionary of Photography.

Chloride of Calcium.—This salt, from its powerful attraction for water, is of frequent use in the laboratory. It is usually prepared by dissolving chalk or marble in hydrochloric acid and evaporating. The salt may be obtained in the crystalline form by allowing a hot, strong solution to cool. If these crystals are heated to a temperature of 300°, water is expelled, and a dry, porous-looking salt remains, which contains two equivalents of water. In this state it is very useful for drying gases or air, and it is most likely used in this state to dry the atmosphere inside the boxes for preserving sensitive paper. Chloride of calcium, when heated to a dull red heat, parts with all its water of crystallisation, and fuses; forming, on cooling, a hard stony mass, which, when broken up, is of use for absorbing water from various liquids—ether, for instance. If a few lumps of this fused mass are placed in a bottle of ether, and the whole allowed to stand for a day or two, and then distilled at a gentle heat, the ether will come over anhydrous. Alcohol cannot be dehydrated in this way, owing to its forming a chemical compound with chloride of calcium. The formula of the anhydrous salt is Ca Cl.

Chloride of Gold.—This salt, in the solid state, is reddish brown, soluble in water, alcohol, and ether, and easily reduced to the metallic state by heat. Its mode of preparation will be found at vol. i., p. 216. It will not, however, be advisable to prepare it on a very small scale, since the unavoidable loss during the operation will make the result more expensive than if it had been purchased ready made. It is very deliquescent, and should be preserved for use either in glass bottles in which the stoppers are ground with extra care, or in hermetically sealed tubes. A better plan will be to dissolve it in water, in the proportion of one grain to each drachm of water, and preserve it thus in solution. Chloride of gold is represented, in chemical language, by the symbols $Au\ Cl_3$, and is thus seen to be composed of one equivalent of gold, and three of chlorine.

Chloride of Iron.—The protochloride, Fe Cl, being a salt difficult to prepare, and of no importance to photographers, we will proceed to the consideration of the perchloride, or sesquichloride, $Fe_2\ Cl_3$. This salt is formed by dissolving peroxide of iron in an excess of hydrochloric acid, evaporating to dryness on a water bath, and then adding water, filtering, and re-evaporating; it forms a very deliquescent dark red mass. Mr. Talbot has recently employed this salt for the purpose of etching on steel, copper, or zinc, by his new photoglyphic process. It acts, in this case, by giving up one third of its chlorine to the metal with which it is in contact, being itself reduced to the state of protochloride. The reaction is (supposing the etching to be on copper) $Fe_2\ Cl_3 + Cu = 2\ Fe\ Cl + Cu\ Cl$.

Chloride of Iodine.—When dry chloride gas is passed over dry iodine at the ordinary temperature, heat is evolved, and a solid chloride of iodine is the result. It is of an orange yellow colour, volatile, deliquescent, and soluble in water. Chloride of iodine was formerly much used in the daguerreotype process, but has been superseded by the bromide of iodine.

Chloride of Lime.—The chemical nature of chloride of lime has been explained at vol. i., p. 306. Owing to its powerful bleaching properties, it is much used in the manufacture of paper; and, being insufficiently washed out, frequently causes failures in the different photographic processes.

Chloride of Silver.—This salt is formed of equal equivalents of chlorine and silver. Whenever a soluble chloride comes in contact with a soluble silver salt, a white precipitate of chloride of silver is formed, which, when pure, darkens rapidly in the light. It is insoluble in water and acids, but soluble in ammonia, alkaline cyanides, and hyposulphites. It may be reduced to the metallic state by being mixed with twice its weight of dried carbonate of soda, and heated to bright redness in a crucible; the metallic silver will then be found at the bottom of the crucible in a lump. In the wet way, it may be reduced by being placed in contact with a piece of zinc or iron, and water slightly acidulated with hydrochloric acid; decomposition of the chloride of silver soon commences, which rapidly spreads through the mass, and presently the whole of the chloride of silver is reduced to the metallic state. If the chloride of silver were fused before this reduction, the resulting silver would appear as a white sponge, retaining the shape of the original lump; whilst, if it had been in the form of precipitate, the silver would appear as a dark grey powder, devoid of metallic appearance.

(To be continued.)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS—(*continued*).

Q. How was the experiment on the proofs conducted?

A. In the following manner:—A photographic proof, fixed with new hypo., was cut into six strips, one strip being immersed in each of the five baths, and one of them preserved as a test of the change which the rest underwent in the operation. The effect was produced with extreme rapidity. The three strips plunged into the sulphuretted liquid, after taking a violet tint, changed rapidly to the yellow tinge, so familiar to photographers. The strip exposed to the action of the hydrosulphuric gas grew somewhat deeper in tone; and that which was immersed in the sel d'or became of a violet colour.

Q. What conclusion was drawn from this experiment?

A. That no doubt whatever could exist as to the action of the sulphuretted liquids, but that the action of the hydrosulphuric gas was less plain. In order to ascertain how far humidity exercised an influence on the discoloration of the proof, each strip was cut into two parts, one being allowed to remain as before, the other being immersed in water for three hours. Those proofs previously immersed in liquid, underwent a very slight change, their tint being a little weakened; no change was observable in that which had been subjected to the action of the sel d'or, but the proof to which hydrosulphuric gas had been applied, rapidly changed to yellow. The conclusion founded on this experiment was, that all sulphurisation immediately changed the colour of the proof, or rendered it easily susceptible of change.

Q. How was the experiment continued?

A. Three of the hydrosulphuric baths had given the same results; but, to make the experiment more complete, and to meet all the objections which had been made as to the action of alkalis, in the baths of sulphide of ammonium and hyposulphite of soda, on the preparation of the hydrosulphuric acid, the experiment was repeated—the hydrosulpuric acid being used, perfectly pure, both in gas and in solution.

Q. How was this experiment conducted?

A. A proof, prepared with new hyposulphite of soda, thoroughly washed, was cut diagonally into four pieces; one of these pieces was submitted, for two hours, to the action of dry hydrosulphuric acid gas; the tint gradually changed to all the varieties of photographic colour—dark red, violet, brown, yellow brown, at which point the operation was arrested. The strip was then cut into two equal parts; one part being placed in water, where, in a few moments, the proof became completely yellow. Another strip of the same proof, sponged on blotting paper, and placed still wet in the preparation, changes to a yellow tint in a very short time. Both experiments established the fact, that a proof sulphuretted while it is wet, changes to yellow; and, that a proof sulphuretted dry, changes yellow as soon as it is immersed in water. After this, the action of a solution of hydrosulphuric acid is beyond the possibility of doubt. Subsequent experiment plainly confirmed the preceding results.

Q. What is the conclusion drawn from these experiments?

A. That in all cases, whatever be the mode employed, sulphuration and humidity united deteriorates the proof.

Q. Is the action of the hydrosulphuric gas sufficient to effect the operation without any kind of humidity?

A. This is doubtful; experiments, however, have shown that a proof perfectly fixed and exposed to the action of hydrosulphuric acid gas, subsequently turns yellow. This may have arisen from the humidity, still retained by the paper; other experiments made with proofs thoroughly dried before the fire, established the fact that such proofs did not change to yellow until slightly damped.

Q. What do we learn from these experiments?

A. The instability of all positive proofs tinted in the baths generally employed. In these baths the hyposulphite is affected by the presence of acids or metallic salts, and under these circumstances the proofs not only undergo unfavourable transition in the bath, but are rendered susceptible of subsequent changes when removed from it, the hydrosulphuric acid being changed to sulphide.

Q. Does this conclusion agree with former experiments?

A. It does; experiments have been made with old and new proofs, and always with a like result; submitted to analytical investigation they have yielded sulphur generally in chemically equivalent proportions to the silver. The destructive action of the sulphur upon positive proofs is demonstrated by analysis, and established by chemical theory, and the general conclusion is, that the sulphuret of silver, however applied, always changes yellow as soon as it is washed or damped.

Q. Do not all proofs fixed or tinted by sulphuration sooner or later disappear?

A. They do; and for these three causes are assigned:

1. The presence of acids in the hyposulphite of soda, which, immediately disengaging the sulphurous and hydrosulphuric acids, leaves on the proofs deposits of sulphur in its native state.

2. The presence of the salts of silver in the fixing bath.

3. The presence of hydrosulphuric acid in the air.

Q. How is the presence of the salts of silver accounted for in the fixing bath.

A. It is easily accounted for in the following way:—In fixing a positive proof in hyposulphite of soda while the proof is still covered with nitrate of silver, that substance mixes with the hyposulphite. If in a common solution of hypo we let fall a drop of nitrate of silver, a white precipitate is instantly formed, which disappears on shaking the solution. The same thing occurs the moment the proof is plunged into the fixing bath. The quantity of matter thus dissolved is very considerable; but a still greater difficulty has to be contended with. Under the action of nitrate of silver, hyposulphite of soda is decomposed; hyposulphite of silver is in its turn decomposed; the precipitate forms sulphuret of silver, and immediately after the decomposed hyposulphite of soda, leaves a deposit of sulphur in its native state. The same action goes on with the proof, and the sulphur deposited in the proof causes it in time partially or wholly to disappear.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, April 26, 1859.

Indisposition has prevented our visiting a second time the Exhibition of Photography; so that we find ourselves obliged to postpone until next week the continuation of our remarks upon it.

M. A. Civiale presented, last Monday, to the Academy of Sciences, the photographs we spoke of in our preceding letter. The view of the "Pyrenees," which we noticed, is composed of four proofs joined together. To produce them, the camera was placed at an elevation of 2,200 yards above the level of the sea, and the horizontal distance from the mountain range was about 2,000 yards. A second panorama composed of the proofs represents a view of the "Maladetta and its Glaciers," taken from the port Venasque (environs of Tuchon). The station for this was situated 2,507 yards above the level of the sea. The horizontal distance which separated the camera from the mountains to be focussed was 4,300 yards. The negatives of these proofs were taken on dry waxed paper. M. Civiale thinks that these descriptions of studies will not only give an excellent idea of the general configuration of mountain ranges, but that the heights of some of the inexplorable peaks may thus be ascertained by taking, as a starting point, heights already determined. The heights already known, and the maps of the country, will give the distance which separates the camera from the vertical lines passing through the different summits; the vertical angles of these summits must then be measured from the station of the camera, and the approximate height of any peak will be obtained by multiplying the base line by the sine of the vertical angle: $h = AB \sin. \alpha$.

At the last sitting of the Academy, M. Gaultier de Claubry demanded that a sealed paper, deposited by him on the 7th March last, might be opened and read. The principal facts it contained are, "that he had been led to make some comparative essays on the influence of light and heat in the production of images on sensitive photographic paper, and had already obtained results which promise success. The paper sensitised with aceto-nitrate of silver, nitrate of uranium, or gelatine and bichromate of potash, placed from 10 minutes to an hour on a sheet of printed paper, and heated to 100° or 120° (centigrade), reproduce the images of printed characters in black ink, but hardly those in red ink; a result analogous to that obtained by M. Nièpce with light alone."

Sig. Secchi, director of the Observatory of Rome, continues to devote his large refraction telescope to photography. He has lately obtained some very interesting photographs of the planet Saturn. His well-known photographs of the Sun have been distributed among astronomers, and are already to be seen in many observatories.

The *Astronomische Nachrichten* publishes a series of experiments on stellar photography, made under the directions of the late Mr. Bond, by Messrs. Whipple and Black, during the year 1857-8. Stars have been classed by astronomers according to their apparent magnitude; thus we have stars of the first, second, third, tenth magnitudes, &c., according to the intensity with which their light strikes the eye of the observer. The end that Mr. Bond had in view was to determine if it were possible, with the aid of photography, to arrive at a new classification of stars, by replacing the uncertain visual appreciation to which we have just alluded, by the action which

star-light exercises upon photographic paper; thereby substituting real measures for the purely optical determinations which have hitherto been in use. Mr. Bond had already made considerable progress in these interesting studies at the time of his death.

M. J. Müller has lately published in *Poggendorff's Annalen* an interesting memoir on the heat of the solar spectrum, in which he has studied especially the absorption of the heat by differently coloured solutions. In the next place he has attempted to ascertain, by means of certain thermo-electrical apparatus, imagined by Melloni, the length of the wave or undulation of the calorific radiations which are met with at the uppermost (least refracted) part of the solar spectrum.

Some preliminary experiments made with a prism of crown glass showed that the calorific spectrum spread itself, above the red rays of the luminous spectrum, over a space very nearly equal to that occupied by the whole of the latter. A result slightly different was obtained with a prism of rock-salt. This part of the author's memoir merely confirms some observations made many years ago by Melloni.—When differently coloured solutions were made to intercept the luminous rays, the following observations were made:—The coloured solution was, for this purpose, placed in a glass vessel with parallel sides, so that each solution employed had the same thickness.

1st. *A solution of cochineal* allowed the red ray of light alone to pass; all the other colours were extinguished.

2nd. *Bi-chromate of potash.* This dissolution allowed the red, the orange, the yellow, and a little of the green to pass.

3rd. *Chloride of copper.* This dissolution absorbed all the colours except the green, which remained, but which was slightly modified.

4th. *Ammoniacal sulphate of copper* allowed only the blue, the indigo, and the violet, to pass.

Respecting the calorific effects, if we represent by 100 the quantity of heat which passes through a layer of pure water of the same thickness as the preceding solutions, we find, by taking the mean of many results, that the proportion of heat which passes through the different solutions is as follows:—

For the red solution (cochineal)	40
" yellow solution (bi-chromate)	74
" green solution (chloride of copper) ...	13
" blue solution (ammoniacal sulphate) ...	18

Whence M. Müller concludes that the quantity of heat distributed over the solar spectrum is thus:—

In the violet, indigo, and blue rays	13
" green rays	18
" yellow and orange rays	34

As to the quantity of heat in the red rays, it is nearly impossible to determine exactly, as we cannot assure ourselves that the red solution did not give passage to any of the calorific rays situated above the red, which are invisible. M. Müller thinks (and in this he is of the same opinion as M. Franz) that about 50 per cent. of the rays which pass through the red solution are invisible calorific rays. This would leave 20 or 30 as the expression of the quantity of heat distributed over the red ray of the solar spectrum.

In attempting to find the length of wave for the heat radiations of the extreme end of the spectrum (*i.e.*, the uppermost extremity, consequently the least refracted), M. Müller has arrived at the figures (in millimetres) $0^{mm},001770$ and $0^{mm},001900$, the mean of which, $0^{mm},00183$, may be considered as representing the length of an undulation of a ray of heat from the extreme upper portion of the solar spectrum.

Messrs. Cornalia and Pancreri have lately presented to the Royal Academy of Sciences at Turin, an interesting memoir on a newly discovered animal belonging to the large family of Crustacea.

The crustacean in question is a small representative of the tribe *Bossyridæ;* it lives as a parasite in the gills of a sort of crab, which is very common in the *laguni* of Venice, and which belongs to the genus *Gebia.* From this circumstance the newly-described animal has been termed *Gyge branchialis.* The Gebia, on which this parasite lives, are easily recognised by a kind of swelling or tumour on the anterior part of the body (the cephalothorax). The *Gyge branchialis* presents the general organisation of Isopodous Crustacea, of which tribe a common species inhabits the gills or the branchial cavities of prawns. One of the most curious characteristics of *G. branchialis* is, that its body is non-symmetrical,—one side is always longer than the other; the right or left side is longest according as the animal inhabits the right or the left gill of the crab upon which it lives as a parasite.

Messrs. Henri Sainte Claire Deville and Debray have just terminated a considerable work on Platinum, and the metals which accompany it in nature. By means of their crucibles of lime, and with common gas mixed with oxygen as combustible, they have actually melted all at once a mass of platinum weighing more than 23,000 pounds! A metallurgical feat never before performed. Their great object in the work of which we speak has been to obtain pure platinum, and also to extract from its gangue the other metals with which it is always associated, such as osmium, rhodium, iridium, &c., so as to form new alloys of these with platinum.

Platinum gangue, and residues of platinum works, have been sent to Messrs. Deville and Debray, from Columbia, Oregon, California, Australia, Spain, Russia, &c. After a most laborious series of manipulations, they have succeeded in discovering new methods for obtaining pure platinum, and have made some alloys of this metal with iridium and rhodium, which may sooner or later become useful in the Arts. One of the most curious scientific results which they have arrived at, concerns the specific gravity of osmium. This metal, which has, perhaps, never before been obtained in a pure state, had a density of about 10 assigned to it by Berzelius. Messrs. Deville and Debray have shown that it is the heaviest metal known, and that its specific gravity is 21.40; that of platinum and iridium never exceeds 21.15.

At the last meeting of the Paris Academy of Sciences, a most important election took place—namely, that of a foreign member to fill the vacancy left by the death of the late Robert Brown, one of the greatest botanists ever born. As there are 65 members of the academy, but only 8 foreign members, it is a greater honour to be elected a foreign member, than to be one of the 65 titular members of the academy. The candidates presented were on the first rank, Mr. Richard Owen, of London; on the second and alphabetically—Messrs. Airy, of Greenwich; Ehrenberg, of Berlin; Liebig, of Munich; Murchison, of London; Plana, of Turin; Struve, of Pulkowa; and Wöhler, of Gottingen. Richard Owen was elected by 41 votes against 5 given to M. Plana, 2 to M. Wöhler, 2 to Sir Roderick Murchison, and 2 to Mr. Airy.* Liebig, Ehrenberg, and Struve, although very great names, did not obtain a single vote!

At the same meeting, M. Dujardin, of Rennes, the well-known zoologist, was selected corresponding member to fill the vacancy left by the death of Prince Charles Bonaparte.

PEOPLE IN THE MOON.

To the Editor of the "Photographic News."

Sir,—By Mr. T. P. Barkas's letter in the "Photographic News" of this week, he seems to me to be labouring under a pleasing delusion with regard to the practicability of distinguishing, by means of telescope, photography, and microscope, objects in the moon of the small dimensions of which he speaks. I beg to differ with him on this point for the following reasons, viz., since it takes a finite time to photograph the moon, there will be (besides the error caused by refraction of every ray which falls upon

* It deserves notice that of the 8 foreign members of the French Academy of Sciences, 4 are Englishmen. These members are at present—Humboldt, Faraday, Brewster, Tidemann, Mitscherlich, Dirichlet, Herschell, and Owen.

the sensitised plate) a great change in the relative position of any object in the moon, on account of her librations in latitude and longitude, which, in so delicate an operation, will not be inconsiderable, so that anything of the size of a rat will have moved relatively to the sensitised plate both in latitude and longitude, and would, therefore, be denoted by a tortuous curve, since the librations in latitude may at one time be greater, and at another time less than those in longitude. Again, allowing that a very small object, as a rat, can be got successfully on a plate, I imagine that a microscope which could magnify so small an object to a capability of being distinguished, would so magnify the imperfections of the best collodion and manipulation, as to make these errors manifold more discernible than the object. When we can get our collodion to such a nicety that no microscope can detect the slightest impurity in it, and when we can get a room for the manipulation so free from dust that no microscope can detect a deposit on the wet film, and when we can find a manipulator who can develop, &c., with the requisite accuracy for so delicate a picture, and when we can find an equatorial which will get rid of any error caused by the moon's librations, and the molecules of the atmosphere will cease to obstruct the pencils of light necessary for so beautiful a discovery as minute objects in the moon—then, I think, and not until then, can we reasonably hope to distinguish small objects in the silvery Eye of Night.—I am, Sir, yours obediently, J. C. BROWNE.

Cambridge, April 23rd, 1859.

Miscellaneous.

WE take the following from the same source which furnished the linseed receipt for removing silver stains:—"It has long since been observed, without any explanation being offered to account for the circumstance, that persons have received *sunstrokes* in the shade, and even when the sun was obscured by clouds. Quite recently MM. Desprets and Foucault have received similar sunstrokes, not only in the shade, but in the shelter of their laboratories. This happened while they were trying some experiments with the electric fluid. M. Desprets has stated that, after standing a little while before a Bunsen's pile of two hundred couples, he experiences almost instantaneously all the symptoms of a sunstroke; that is to say, pain in the head, smarting in the eyes, redness in the face, and the conversion of the skin into scales. Some time previous to this M. Foucault was using a Bunsen's pile of twenty elements, and deprived of its glass handles. The experiment lasted rather more than an hour, but frequent interruptions did not allow the battery to be used more than twenty minutes altogether. Neither M. Foucault, nor a friend who assisted him, felt any sensation of heat in the face. Nevertheless, on the following day, both of them bore on their faces an erythema of a purple colour, with a sensation of restraint and tension. In M. Foucault's case the right side of the face was exposed to the luminous focus, and the redness was entirely on the right side from the roots of the hair down to the chin. In his friend's case, the redness was confined to the forehead, owing, apparently, to his having been obliged, during the experiments, to stand with his head bent down. In both instances the skin on the parts attacked had precisely the appearance that would have followed a sunstroke. A slight desquamation ensued, which lasted five or six days. No such effect followed when the electric light was passed through glass coloured with uranium. Hence it is pretty certain that sunstrokes derive their origin, not from the yellow calorific rays or the red light rays, but to the violet rays known as the chemical rays; these, as is known, determine the combination of chlorine with oxygen, and decompose the chloride of silver. From this discovery, due to chance, that greatest of inventors, it follows that not only is the sun deprived of one of its properties, but the moon participates in the spoliation. We often hear country people (in France) speak of *moonstrokes*, and which are frequent and almost inevitable in New Grenada. Now all this is explained; the moon has been wrongfully accused, and what we have related above is another proof of the innocuousness and the insignificance of the action of her light. There is one more erroneous expression to be changed. No doubt it will one day disappear, but when? The *routinière* notion which still insists on using the terms an "ounce," a "league," a "foot," in spite of the promulgation of the metrical system three-fourths of a century ago, will not speedily rectify an expression which use has made almost a proverb. Ten generations will doubtless roll away before they will submit to sound sense and say, '*I have received a chemical ray stroke.*'"

LIFE IN THE MOON.—A circle of one second in diameter, as seen from the earth, on the surface of the moon, contains about a square mile. Telescopes, therefore, must be greatly improved before we could expect to see signs of inhabitants, as manifested by edifices or changes on the surface of the soil. It should, however, be observed, that owing to the small density of the materials of the moon, and the comparatively feeble gravitation of bodies on her surface, muscular force would there go six times as far in overcoming the weight of materials as on the earth. Owing to the want of air, however, it seems impossible that any form of life analogous to those on earth can subsist there. No appearance indicating vegetation, or the slightest variation of surface which can, in our opinion, fairly be ascribed to change of season, can anywhere be discerned.—*Sir John Herschel's Outlines.*

THE COLOURS OF NATURAL BODIES.—M. Prevost states that the colour of bodies, as commonly observed, is altered by the white light which comes to the eye mixed with the rays producing the colour; this white light, however, may be removed by a series of reflections from surfaces of the same substance, and at the same time the relative intensity of the true colour will be augmented. Thus a ray of light, reflected several times from polished surfaces of gold, is at last deprived of all undecomposed white light, and gives a deep red orange as the real colour of gold. The colour of copper obtained in this way is a scarlet, that of silver a fine yellow, and that of tin a deep golden yellow of the common hue.—*Journal of Science and the Arts.*

Photographic Notes and Queries.

IMPROVED DEVELOPING BOX.

SIR,—Every one who seeks for instruction on any point or a means of overcoming any difficulty, by applying to your valuable paper, does good to his neighbours as well as to himself.

I was in the very same dilemma the other day as one who applied to you; having poured a lot of silver bath into about 6 ounces of positive developing solution, I was about stating my case and asking you for help, when your paper came to hand, and I have since recovered my silver. "Every little helps," especially to a beginner, and I wish to tell those of your readers who have developing boxes how to make them really of use, for to tell the truth I could not do anything in mine till by good fortune I thought of substituting an overcoat for the *top*. I got my box made like one described in the last number of vol. i., having an armhole on each side, a glass in the end and one in the lid, through which to look; this last I found quickly got covered inside with moisture, and that generally at the most critical time—when the development was drawing near an end. I could not see what I was about—I saw indeed but badly before the glass got clouded. Then in drawing up the dipper out of the bath, unless your box is very deep, you have not room. Yesterday I gave it up in despair, and it was one of those beautiful photographic days that so seldom come. I had not even yet succeeded in producing a negative that I thought warranted me in putting down my name on the club list. I took off the cover and tacked my "poncho" round the outside of the box, beginning over the end window and fastening it on each side about half way, just over the armholes: now, by throwing the cloak over the shoulders and stooping into the box, having the breast close to the edge of the end opposite the light, and the arms through the sleeves, one can work beautifully; if it is requisite to shift anything out or in, as for instance when it is requisite to put a coated plate into the bath, hold the plate in the right hand, insert the left under the

cloak and in through the elastic of the sleeve; then, the covering cloth not being yet over your head, and not even wholly over the box, place the plate in the left hand, stoop down the head, and with the right draw over it the cloth, and bring the sides close under the chin. Now press the chest against the edge (this secures the cloth and prevents any leakage of light), and then insert the right hand, which as well as the left is now free to work with; in this way anything can be shifted in or out in one tenth of the time necessary to describe it; and when once this plan is tried I am sure no one will again resort to the lid, to take which, by the way, on and off with one hand, one being inside to give or receive anything, is far more troublesome than the way I have described. You can watch the development then as easily as in a dark room, and when once the development is stopped and the plate washed there is no necessity for continuing with your head in *a bag*, you can fix in the open air. I also do the coating outside, and I find, by having a deep cover, something like the cover of a bandbox, made of gutta percha, to fit easily over the bath top, *but having a slit through which the glass dipper goes up*, that one can uncover the box altogether, even when a plate is in, without any bad consequence. I need say no more, but that the three prints I inclose are from the three first negatives I ever took in my life. I never before succeeded with a negative, and I would wish to know from you, are they good enough to warrant me putting down my name on your list for exchanging pictures?

A Kerry Man.

THE COLLODIO-ALBUMEN PROCESS.

Sir,—Your correspondent "Photos" is unsuccessful with the collodio-albumen process, and asks the cause "why the film cracks in the fixing?" Without seeing a plate, I could not with certainty tell him what is the cause; from his description, I suppose it to be a "wrinkling" of the film, such as would be the case if the picture were fixed with cyanide instead of hypo. This is an expansion of the film, making it too large for the plate. I would suggest that he should fix by pouring on the hypo. instead of placing the plate in a dish, washing it carefully, and drying quickly. The alcoholic collodion your correspondent uses is not by any means the best. Any of the good negative collodions will do; some are much better and more rapid in action than others, and I should strongly recommend your correspondent to try one or two plates, before he ventures to prepare as many as forty. I know an instance of a person reading of a very simple negative process; he purchased a camera, prepared six dozen plates, took them to Ireland, and exposed them all; on his return, instead of six dozen pictures, he had as many dirty glasses. Of course, he blamed the process, instead of his own folly in making no trials before he went from home. No process yet discovered is absolutely certain, but I think the collodio-albumen is the nearest perfection of any, if proper precautions be taken. I have gone from home with twenty-eight sunshine plates, and at the end of three weeks have developed twenty-eight faultless negatives. But this is the exception; it rarely happens that one has not a failure or two, but even these are useful, if the "causes of failure" are carefully investigated and noted for future guidance.

Josh. Sidebotham.

PORTABLE TENT.

Sir,—In the "Photographic News," vol. ii. p. 82, is a description of a dark tent by F. R. E. May I beg to be allowed to state that the mode of constructing the framework, which constitutes its chief peculiarity, is identically the same as that adopted in the tent which was first exhibited by myself at a meeting of the Blackheath Photographic Society in November, 1857, and, subsequently, at the North London Society, and others. My tent is made of light wood instead of iron, as proposed by your correspondent, and is rendered still more rigid by the addition of a table, which is so fitted as to complete the system of triangles of which the frame is composed, and which constitute the chief feature as to its originality, and by which great rigidity, combined with lightness, is obtained. The arrangements of doorway and window are the same in your correspondent's plan as in my own.

C. W. Smartt.

[We have in vain searched for a description of a tent similar to the one described by "F. R. E." in the "Photographic News" for April 21, 1859, and published anterior to that date.—Ed.]

PHOTOGRAPHIC PERAMBULATORS.

Sir,—I owe you my best thanks for your obliging insertion of my letter relative to colouring magic-lantern slides, and likewise your correspondent Harry Bellini for his useful and well expressed hints on this subject.

By way of adding my mite to the numerous appliances which are, no doubt, being coopered up in every part of the kingdom for the approaching summer campaign, I send you the enclosed pen and ink sketches of a photographic perambulator, which, I believe, will meet all the requirements of wet collodion in the field.

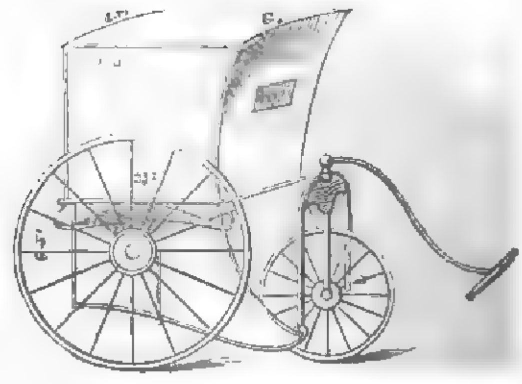

Fig. 1.

Fig. 1 represents a side and front view of a light carriage suited to any size of plate. It may be constructed of light, tough framework (Canadian walnut wood is, probably, the best), and lined inside with American cloth, or lightly boarded over and varnished. Fig. 3 represents the back closed up; when wanted for use, the two knobs A A must be seized and the doors pulled open. This movement elevates

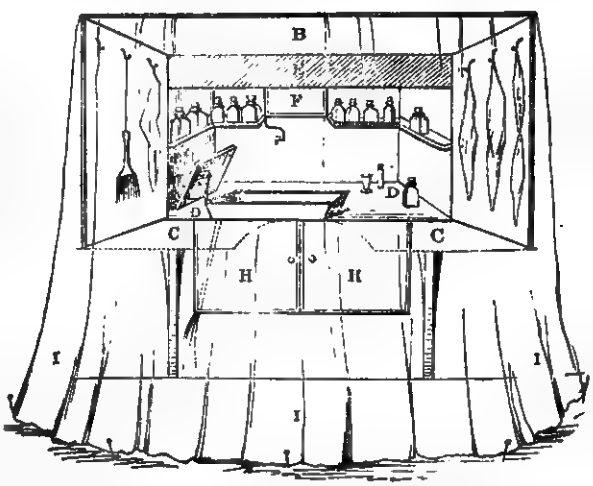

Fig. 2.

the hinged roof B in Fig. 2, allows the shelf C C to drop down to a level with the operating shelf D D, and scatters

the curtain I to the ground. The front of the shelf C C, is curved out to allow the operator to get close to his chemicals, and also to kill any chance ray of light which might penetrate from beneath. When the curtain, which is carefully tacked all round the edges of the doors and elevating roof with a short length depending from the operating shelf, is drawn and crossed over in the centre, the photographer will find himself in a convenient dark chamber lighted by one small window F of dark yellow glass, placed in front. Immediately above it is a strong zinc reservoir E for water, extending the whole breadth and nearly the depth of the perambulator. It is filled from the outside at the screw plug C, and is capable of containing about twenty gallons—a quantity sufficient to quench the demand of a very thirsty operator. The two chambers H H, are intended to hold the camera and stand, box of plates, plate cleaner, and probably a paper of sandwiches, with the usual accompaniment of a nice little bottle or two of pale ale. The rest of the details are self-evident from the sketches, and may be modified to suit the convenience of each individual.

The dimensions are—Fig. 1, height 6 feet, breadth 4 feet, depth at the narrowest part 3½ feet, wheels about 4 feet in diameter.

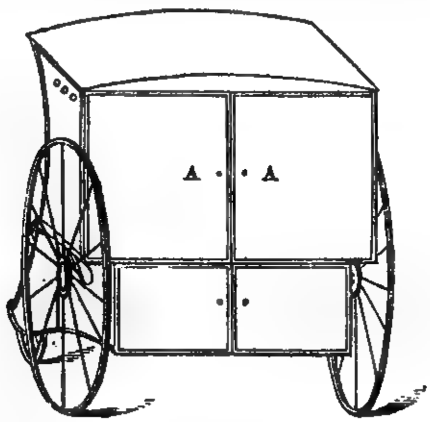

Fig. 3.

I feel certain the foregoing will meet the exigencies of many a photographer who, instead of spending money on dry plates, will boldly march to the field with his perambulator before him, flourishing his collodion bottle as his standard, and who will not desert his colours till either his developer is exhausted, or his box crammed with good negatives. William Cochran.

PHOTOGRAPHS IN NATURAL COLOURS.

Sir,—In reply to your correspondent H. I. S., as it is about three years since I obtained the photograph in natural colours I mentioned, I have forgotten where I purchased the collodion I used on the occasion, otherwise I could probably ascertain how it was iodised. It was negative collodion, and had been iodised the day previous. The bath was a 30 grain one; I do not remember whether it was new. The developer—

Pyrogallic acid	6 grains.
Acetic acid	1½ drachms.
Alcohol	¼ drachm.
Water	8 ounces.

I was desirous of trying what would be the effect of very white light and operating as for negatives, but with very short exposure. I therefore placed a white sheet between the sitter and the sun, which was shining brilliantly, and I had also a white sheet as a background. The lens was a small "quarter plate" portrait, with the full aperture and the exposure as for positives. I did not find the colours appear during development, which was carried on by the light of a candle placed high up, but directly the hypo.—a saturated solution—was poured on the plate, the colours started out very bright and clear. Although all the pictures I took that morning, between 11 and 1 o'clock, and on other occasions, showed the natural colours, only one retained them after drying, and why this should have retained them I cannot understand. The only difference between it and the others is, that the deposit of silver is rather thinner; the colours in all were nearly as bright on the reverse as on the collodion side. I should mention that a purple dress gave the complimentary colour yellow; but one, a pale yellow with brown figures, gave the colours perfect. I am disposed to attach little or no value to anything yielding such uncertain results; perhaps, however, it would be worth while to make some experiments with the prismatic colours in *very white light*, and for this purpose I should recommend that the colours should be painted in broad bands with *transparent* colours on a white ground, that will not absorb them, as porcelain or a canvass prepared with white.

I think your correspondent would not find the transferred film answer except for positives by *transmitted* light, as the whites of the pictures even on paper would not be clear. I think positives on albumenised paper, burnished on the back with an agate burnisher, would have nearly as much delicacy and finish as collodion. I inclose you a small burnished positive. Thomas Barrett.

CREASING OF THE COLLODIO-ALBUMEN FILM AFTER FIXING.—HINTS ON THE FOTHERGILL PROCESS.

Sir,—I have met with the same difficulty as your correspondent "Photos," in the "News" of April 21, the creasing of the film after washing away the hypo. The other day, at the meeting of our Photographic Society, I laid my case before the meeting, and one of the members helped me to the following solution of the difficulty, which I have since found correct. When hypo. is alkaline, it creases and curdles up the albumen film on collodion; by adding a few drops of acetic acid, the alkaline action is removed, and the result is an even surface. Some samples of hypo. are decidedly alkaline, and, therefore, when purchasing new hypo., it is advisable to test for alkaline action, and if it is present add the acetic acid.

I have of late slightly altered my working of Fothergill's process with advantage, which may also be worth communicating to your readers. The greatest difficulty after getting suitable materials (and that is an important matter), is the washing after the nitrate bath; many condemn the process, because they fail in this; any gentleman that has found his plates unevenly sensitive will find a great improvement by using two baths. I use a bath 35 grains of nitrate silver to the ounce, then transfer the plate to a 2 grain bath; both of these should be neutral, or give only a slight acid reaction to test paper. Drain well after the latter bath, and for a stereoscopic plate, pour over 2 drachms of filtered rain water, and run it round once or twice; drain again, and coat with albumen as usual. By this plan unequal sensitive places are avoided, the great drawback in this process. I fixed the plates much quicker than collodio-albumen and sooner developed. A bright clear negative is the result, quite equal to wet collodion, if the exposure is well timed.

Manchester. J. H.

IMPROVED DISHES.

Sir,—I think the following may be of service to many of your readers.

To make a nice developing dish:—Select a flat piece of glass and cut it to the size of your gutta percha dish, so that it will just fit on the bottom; then, with a little shellac varnish, or gutta percha solution, fill up the edge to prevent the developing solution from finding its way beneath the glass plate. If done neatly, you will have a capital dish, with less cost and less liability to be broken than a glass one.

G. W.

ANSWERS TO MINOR QUERIES.

Glass Triangles.—*Talbotype.* Glass triangles will be found exceeding useful in many operations of the talbotype and other processes. One may be easily made. Take a piece of solid glass rod about fifteen inches long and a quarter of an inch in diameter, and divide it into three equal parts by two dots of ink on it; then hold it in the flame of a gas burner or spirit lamp at one of the marked places (introducing it gradually to avoid danger of the glass cracking), and when soft bend it to an angle of 60°. Then repeat the operation at the other marked place, and the result will be an equilateral triangle. A very skilful operator may now fuse the two ends together with a blowpipe, but the generality will do well to remember that it is better to "leave well alone." In immersing paper in various baths, a few of these simply constructed glass triangles will save a great deal of handling.

Restoration of Old Hypo. Baths.—*Aristarchus* asks if he cannot precipitate the silver from a large quantity of hyposulphite of soda solution which has become saturated with iodide of silver, in such a way that it can be rendered available for fixing fresh pictures. If solution of sulphide of ammonium be added to the hypo. solution until after brisk agitation the solution still smells slightly of that reagent, all the silver will be precipitated in the form of sulphide of silver as a black powder, which may be filtered off and reduced to the metallic state by one of the methods described in our first volume, whilst the solution will contain, along with a slight excess of the sulphide of ammonium, the hyposulphite of soda in a state ready for use again. As, however, the presence of the smallest quantity of free sulphide of ammonium in the hypo. will prove very injurious to the pictures which are to be fixed in it, the solution must be heated to ebullition, and exposed to the air in a shallow vessel, until all smell has disappeared from it. This plan answers perfectly well for the hypo. bath which is employed in the collodion process, but is not quite so successful when used for positive printing, as the tones of those pictures which are first immersed in the renovated bath are liable to suffer materially.

Packing Bottles in Cork.—*Zeuxis* inquires the best plan for packing bottles in a case for tourists' purposes, to avoid danger of breakage. We strongly advise the adoption of a very excellent suggestion of Mr. Sisson's, namely, to divide the box in which the bottles are to be packed by means of thin sheets of cork. The bottles should be *square* and they should fit tight enough to require *pushing* into their places. The advantages of this plan are evident, and we think that it should be generally adopted. Cork is light, inexpensive, will stand all climates, gives to pressure, is easily glued, and can be procured almost everywhere.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. S. I.—1. We will forward the letter as soon as we can find the address. 2. Your plan seems quite as good as any we have seen, and with your permission we will give it to our readers. 3. Your bath has become charged with organic matter, and no amount of acid will, therefore, prevent the fogging. Try the following plan:—Place ten or a dozen grains of metallic cadmium into a perfectly clean flask and pour the bath in; boil violently for about a quarter of an hour, then filter, and make very faintly acid with acetic acid. We do not doubt that this will prove an effectual remedy.

Henry X.—Received.

Excelsior.—Your two specimens of glass positives arrived too much broken for us to be able to form any judgment upon them. From your letter, however, we think that you would obtain the tone you want by practising the alabastrine process, for which see our first volume.

A. L.—The fault is in the collodion. Use one giving a rather thicker film.

A Regular Subscriber.—1. We cannot answer such questions; apply at one of the photographic houses who advertise in our columns. 2. See opposite. 3. Filter off from the precipitated carbonate of silver, and then slightly acidulate with acetic acid.

L. J. Gaskill.—Received.

Sol.—1. Great experience is required in order to get even passable results with the processes you have attempted; they must be regarded more in the light of curiosities than anything else. 2. When *parts* are mentioned in a formula either drachms or ounces may be taken, or any convenient subdivision, and solid and fluid measures may also be considered as mutually convertible. 3. Pinholes in the negative may arise from many causes. Iodising the collodion with impure iodide of potassium, or not allowing it to settle well, are among the most frequent causes.

Tento.—1. We prefer the lenses you have called No. 4. For chemicals try the house No. 2. 2. We shall be very pleased to receive a description of your improved apparatus. 3. The difference in the apparent velocity of a ray of light, caused by the rotation of the earth, is too trifling to have any effect one way or another. The earth revolving at the rate of 1,000 miles an hour would, it is true, cause us to meet the rays of light at sunrise and move away from them at sunset: but the velocity of our translation to or from them would only be about 16 miles in a minute; and it cannot be imagined that this quantity added to, or subtracted from, a velocity of 12 millions of miles per minute would alter the photographic effect of the light. Were it possible to be carried forward towards the source of light with a velocity at all commensurate with that of the light to us, the first effect of such a movement would be an alteration in the colour of the light, each coloured ray would amount higher towards the vilet end of the spectrum, owing to the increased apparent rapidity of vibration caused by the rays being *met* at such an enormous velocity.

Revd. T. Banner.—We have a letter waiting for this gentleman; to what address shall it be posted?

F. Woodward.—We will endeavour to obtain the information you require.

P. Atherton.—We can only reply to your questions by recommending you to have as much glass as possible, both on the roof and sides of your glass room.

W. F. M.—Received.

H. F. St. J.—We have answered your queries by post.

"Pilot."—There is an error in the first statement; that at p. 224 is correct.

E. M.—We prefer the picture taken with the ¾-in. stop. The negatives are tolerably good, except in the skies, but the prints are too red.

R. Gordon.—Received with thanks.

A. Henderson.—Your stereograms are very beautiful, and we shall have great pleasure in inserting your name. Your success with Fothergill's process is very complete. Can you not favour us with some account of your experience in that, or any other process for publication?

A. G.—See answer to *Sol.*

Apparatus for Washing Positives.—It has been pointed out to us that Mr. Hayes has overlooked Mr. Barrett's description of an apparatus for washing positives at vol. i., p. 141, or he would have seen that his and Mr. Barrett's contrivances were similar.

Ebeniste.—Consult the index of vol. i.

Ignoramus.—We have heard no account of the process farther than what the inventor gave. If you cannot succeed at it, we advise you to stick to Θ's, which we really can recommend. As soon as we have time, we intend to try the experiments referred to.

A. R.—The word collodion is derived from a Greek word signifying *glue*, owing to its adhesive nature, which was first made use of for adhering to the skin, and forming a protecting coat over wounds, &c. The word collodion now has become thoroughly Anglicised, and, as is frequently the case, is used in other than its strictly etymological meaning. Thus, it is perfectly correct to speak of a solution of cellulose in oxide of cuprammonium, as a new kind of collodion.

An Amateur.—Two letters received.

D., Kirkaldy.—We would willingly insert our correspondent's name but it is not written sufficiently legible for us to read it.

Zetetic.—Answered in the present number.

X. P. R.—We shall always be glad to receive articles from our correspondent on so interesting a subject. The reason why a diaphragm should be at a certain distance in front of the lens, instead of close to it, is that in a corrected lens, *oblique excentrical* pencils of rays come to a focus more nearly in the plane of the focussing screen, than oblique *centrical* pencils: by oblique, we mean pencils from objects which form the margin of the field of view.

Common Salt.—1. An erecting eye-piece will be required, which is almost beyond the capabilities of an amateur to make. 2. The usual negative developer. 3. Citric acid may be used, but as a general rule we prefer acetic acid.

A Jersey Amateur.—You will not meet with much success in attempting to convert bad positive into negative collodion. In the Fothergill process you can meet with pretty good success by using almost any good collodion; but the best results are to be obtained by using collodion specially prepared for the process. We shall be glad to hear of the result of your experiment. We, however, doubt your success.

A Photo.—The best transparent glass stereograms which we have seen, are copied in the camera from large negatives as described at vol. i. p. 22. We believe the process used is the albumen, or some modification. Very good prints of this kind may be taken by printing on a dry plate from a negative in a pressure frame. Try the collodio-albumen, or Fothergill's process, in this way, and exposing only a few seconds.

F. O. L.—Received with thanks.

F. Vincent.—1. A toning bath made by your formula will be ready for use six hours after mixing. 2. Good common water is what is always used for washing positive prints; but there is no doubt distilled would be better if it were used in sufficient quantity.

Dunedin.—1. We know no more of the process than appears in our columns; we should, however, advise you to try the collodio-albumen process. 2. It may be used repeatedly if poured back into the bottle after one batch is toned. 3. Yes, it is a good way to iodise the bath.

Querist.—Of course.

A Beginner.—The stereoscopic transparencies on ground glass are taken by printing the picture from a negative on a dry plate in the ordinary way, preparing the sensitive surface on the *ground* side of ground glass.

A Hard Working Amateur.—We know nothing more of the process than is given at vol. i. p. 85.

W. Sturgeon.—You can remove the albumen from the surface of an albumenised paper print by boiling it in solution of caustic potassa, containing about 1 part potassa to 10 of water. The photograph will be uninjured, although slightly altered in colour.

A. Taylor.—Received.

S. Fry.—Received with thanks.

Erratum.—In the review of the stereogram of the moon given in our last number, the photographer's name was erroneously given, "Herbert Fry"—it should have been "Samuel Fry."

Communications declined with thanks:—X. P. Q.—A Soldier.—F. (Liverpool.)—Ellen M.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Mem.—Rev. Q.—A. R.—Telemachus.—W. S. L.—Edinburgh.

In Type:—A Kerry Man.—E. S.—J. B.—H. S. I.—Hugh Robert Rump.—C. W.—J. C.—C. P. W.—Beta.—W. L.—R. P. H. N.—John Draffin.—T. Millard.—X. C. R.—Aliquis.—J. S. Maginn.—Viator.

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⁂ Subscribers can have the numbers of the first volume strongly bound in cloth, lettered, for 2s., if sent to the office; or, if accompanied by a cloth case, the charge for binding will be 6d.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 35.—*May* 6, 1859.

A NEW COLLODION FOR FIELD WORK.*

BY J. E. MAYALL.

The prime requisites for a collodion for landscape photography are, that it shall be stable in its composition, not easily decomposed at the varying temperatures to which it is liable to be exposed, that it shall not become troubled by agitation, shall contain within itself the property of absorption of some of the moisture to which it is unavoidably subjected, and that the film when silvered shall have good keeping qualities—not liable soon to dry, to fog, to spot, to tear, to come off the glass; or to the thousand and one difficulties to which the landscape photographer is now exposed.

The bath, the developer, and indeed every part of the process, should be looked at from the point of view that the operator is in the country, far from the succouring aid of the chemist's shop, the advice of friends (which, by-the bye, is no great loss), the accidental obliviousness of some important article left behind in the last hurry of departure. I may remark that I have had these difficulties in view in perfecting the process which I have now the honour to read to this society.

First. The preparation of the pyroxyline—

	Blotting paper	100 grains.
Mix—		
	Fuming nitrous acid, sp. gr. 1.450 ...	4 ounces.
	Water	½ „
Add—		
	Sulphuric acid, sp. gr. 1.830	5 „

Cut the paper into strips, and slightly damp it with steam. Mix the nitrous acid and water, and then the sulphuric acid, in a bell glass. Put the paper into the acids with a glass rod, and cover up the vessel with a piece of flat glass. Let it stand in a basin of hot water till the temperature of the acids is 130° Fahr., for twenty minutes. Pour out the acids into another glass, and wash the paper as rapidly as possible, to get rid of the bulk of the acids, and allow it to stand under a running stream of water for six hours.

To the acid remaining from the above process, add 1 ounce of sulphuric acid, and then put into it, in small tufts at a time, 50 grains of clean cotton-wool; get up the temperature of the acids to 130° Fahr. again; soak half an hour; wash, as before directed for the paper, six hours in cold water, and dry at the ordinary temperature of the atmosphere; merely towards the last dry by gentle heat; when dry expose to the rays of the sun for half an hour. The increase in weight ought to be 50 per cent.

Remarks.—As it is difficult to obtain acids of the exact specific gravity above named, the operator must, for weaker nitrous acid, use a little more sulphuric in proportion. An excellent plan is to try three samples with varying quantities of sulphuric acid, until the exact proportions are found. Mr. Hardwich recommends 140° Fahr. as the temperature of the acids, but as he uses much more water and sulphuric acid in proportion to the *nitric* acid, it can do no harm; but I find on increasing the temperature beyond 130° Fahr., there is a loss of weight in the pyroxyline; also, it becomes powdery and not so good.

Rule.—The heavier the pyroxyline is from a given quantity of paper and cotton, the better is its quality.

Ether, pure or methylated, if well washed and not acid, I find equally good, sp. gr. 720.

* Read at the Meeting of the Photographic Society, May 3, 1859.

Alcohol should be specially prepared for this purpose Ordinary alcohol, sp. gr. 820, should be well washed with dry carbonate of potassa and chloride of calcium for two days; say an ounce of each salt to one gallon of alcohol, to render it perfectly *anhydrous;* then distil over, out of doors, in a water bath; the chemists prepare this, and no one who has not had considerable experience in this operation ought to attempt it. The alcohol thus prepared is almost as explosive as gun cotton.

COLLODION.

Alcohol anhydrous	20 ounces.
Ether	10 ounces.
Iodide of magnesium	120 grains.
Bromide of ammonium	45 grains.
Chloroform	2 drachms.

Shake the chemicals well together, until the whole is dissolved; should the bromide of ammonium be difficult to dissolve, add a few drops at a time of ordinary alcohol to assist it, but not more: when perfectly dissolved, add 180 grains of pyroxyline from paper, and 60 grains of that from cotton. Agitate well, for two or three hours at intervals; try a plate; if the collodion is too thin, gradually add a little more pyroxyline, until you get the proper consistency. Here it is difficult to give the exact weight of the pyroxyline, for one kind is much more soluble than another, owing to some accidental circumstance in making it. This collodion will keep excited for two years without any perceptible change, either from varying temperature or from pouring and repouring in the usual way from a bottle.

The iodide of magnesia has properties eminently qualified for out-door work. Its easy solubility, particularly in the presence of a salt of ammonia, is well known to every chemist; and is, indeed, its chief characteristic to distinguish it from lime on the one hand, and strontia on the other; and, as it is such a powerful absorbent of moisture, it prevents decomposition of the excited collodion. The bromide of magnesium is even more deliquescent, and is an excellent excitant where extreme rapidity is not required, but not near so sensitive as the combination above given.

In order that the amateur and practical photographer may not be foiled in his attempt to put this process into practice, I now give another form that answers very well; my friend, Mr. Rosling, says better than anything he has tried.

Ether, sp. gr. .720	20 ounces.
Alcohol, sp. gr. .820	16 „
Iodide of magnesium	144 grains.
Bromide of magnesium	54 „
Chloroform	3 drachms.

Shake well, then add sufficient pyroxyline to render the collodion of moderate consistency, say 8 to 10 grains per ounce. Shake well, then add 4 drops of a saturated solution of iodine, 18 grains bromide of ammonium, or about 3 ounces of old excited ammonium collodion instead of the bromide of ammonium; shake well, and let stand 24 hours before using. Decant into 6-ounce bottles, and hermetically seal them ready for use.

I may remark in passing that the bromides are the true key to the middle tints. If you want excessive detail, as in leaves of trees and opaque objects, use more of the bromides; if you want intensity, use less.

SILVER BATH.

Nitrate of silver	50 grains.
Distilled water	1 ounce.
Iodide of magnesium	½ grain.

Neutralise the solution of nitrate of silver with caustic potash; then for every ounce of bath with the ½-grain iodide of magnesium, precipitate a small quantity of iodide of silver from the nitrate, well wash the precipitate before adding it to the bulk of the solution of silver, let it stand a few hours and filter; then for every 30 ounces of silver bath add 30 minims of glacial acetic acid, and 5 minims of nitric acid, so as to render the bath decidedly acid; this bath will keep for any length of time by now and then adding a crystal of nitrate of silver to dissolve the excess of iodide of silver which accumulates in the bath, and every few days add a few drops of glacial acetic acid. A good plan is to refresh the bath with a 60 grain solution of nitrate of silver, properly prepared according to the formula given, and refresh the bath every night after working. The gravity ought to be from 8 to 10 per cent.; if less than 8 per cent. the bath must be refreshed with additional nitrate of silver. Once a week expose the bath to the sun for half an hour. No other collodion must be used in this bath. As there is much alcohol in the collodion, the film requires to be well set before dipping it in the silver bath.

Developer.—2 ounces of iron tacks and 2 quarts of water put into a stone jar; to this add 2 ounces of sulphuric acid, and in 48 hours a solution of protosulphate of iron will be formed of about the strength required for a developer.

Of this solution take 10 ounces, to which add 2 ounces of common acetic acid (30 per cent. acid), one ounce of alcohol; one or two trials will show if the developer be strong enough; if the image of the camera comes out too quickly at spreading on the developer, reduce it with distilled water till the required strength of the developer is once obtained, and then observe it.

To refresh the iron jar again, add 2 quarts of water and 2 ounces of sulphuric acid; cover the solution with a lid to exclude the air, and it will be ready when wanted; it will keep better if 6 ounces of alcohol be added to every two quarts of iron solution, and bottled off and kept in the dark.

ANOTHER DEVELOPER.

Protosulphate of iron	2 ounces.
Distilled water	1 quart.
Alcohol	4 ounces.

Dissolve the iron and call this the stock solution. To every 10 ounces of protosulphate of iron solution add 2 ounces of common acetic acid (30 per cent. acid). A few drops of sulphuric added to the stock, will keep the developer clear from fogging. Always filter the solution just before using. As the whole of this process is exceedingly sensitive to light, the greatest care will be requisite to exclude the stray light both of the dark room, of the slides, and of the camera; wash the plates well before fixing.

FIXING SOLUTION.

Cyanide of potassium	12 ounces.
Water	2 grains.

either in a bath similar to the collodion bath, or by pouring on the plate separately.

Hyposulphite of soda is a good fixing agent, but I find the negatives fixed with hyposulphite of soda bleach afterwards unless they are uncommonly well washed.

The practical photographer will, at a glance, see the value of this process as a whole.

First, this collodion is not liable to decompose, it is always the same, it contains within itself a powerful corrective of moisture, and consequently of decomposition. The bath is not liable to fog, as it is always decidedly acid, and requires to be so; it also contains slight traces of nitrate of magnesia, which is a preservative agent, and enables the plates to be kept a long time moist.

The mixture of paper and cotton renders the film much tougher; it will resist any amount of washing.

Should there be any signs of reticulation of the film, it arises from the alcohol not being sufficiently rectified, and in that case, more ether will be required in proportion to remedy the defect. I have preferred to give the process just as I work it, no matter how it may jar with any theories or any other practice. My friends who have taken the trouble to work it, some of them in the tropics, others at the antipodes, and others again in the icy regions of Canada, all write of their success. And should the indomitable photographer of this country find in it a process that he can take up and leave off at pleasure without any of those mortifying failures which sometimes overtake the most persevering, I shall be amply repaid for the trouble I have taken in bringing it before the Society.

THE DIFFERENCE BETWEEN THE ACTIONS OF HEAT AND LIGHT ON SALTS OF SILVER.

BY MM. ED. BOUILHON AND E. SAUVAGE.

M. Niepce's experiments, which have attracted the attention of so many educated persons, have been taken up and continued in the laboratory of Baron Thenard.

Knowing the disputes to which this subject has given rise, we took extraordinary pains in repeating the experiments. The reductions obtained by means of insolated tubes by M. Niepce, ascribed by some exclusively to the action of heat, and by others to the action of light, are not due either to the one or the other, as we shall prove further on. As far as these differences of opinion are concerned there is not much occasion for surprise; they arise, we conceive, from incomplete researches, for analogous phenomena are produced under the separate action of each of the two agents, as was shown by M. Niepce in his last memoir on the action of heat.

When a tube containing a paper that has been saturated with nitrate of uranium, and insolated, is opened in a dark room, and its orifice applied to a piece of sensitised paper, after about twelve hours a very sensible reduction is observable on the part corresponding to the opening. If a few drops of distilled water be previously dropped into the tube the reduction is more rapid, and if the temperature be carried up to about 176° the same result will be produced in from ten to twelve minutes. If the tube be heated without the addition of moisture, the action is more rapid than when cold, but less so than when water has been inserted.

On the other hand, if a piece of sensitised paper be exposed to the direct action of the vapour of distilled water, the reduction is effected in from fifteen to twenty minutes.

The photographic positive papers, which contain an excess of nitrate of silver, give the same results.

What conclusion are we to derive from these facts? That there is, as in the first experiment, an action which is accelerated by the vapour of water; and, as in the second, that the vapour of water alone may give the same reductions.

It was when we had arrived at this point, that the idea of submitting to the action of the insolated tubes, papers impregnated with salts incapable of being reduced by heat in presence of organic matter, led us to make the following experiments:—

If we put a pure chloride of silver paper under an insolated tube, we obtain in twelve hours a very strong reduction. The same results are obtained if we employed pure iodide of silver or bichromate of potash.

Although these experiments may be considered very clear and conclusive, we desired to corroborate all the facts obtained, as much for the purpose of sheltering ourselves from criticism, as for our own entire satisfaction; and this is the plan we adopted. We washed five papers in distilled water, and afterwards impregnated the first with nitrate of silver; the second, with chloride and nitrate of silver; the third, with pure chloride of silver; the fourth, with pure iodide of silver; and the fifth, with bichromate of potash. The whole of them were then placed on a copper plate heated on a water bath. After ten minutes, two papers only gave signs of being acted upon; that prepared with nitrate of silver, and that prepared with chloride and

nitrate. The others were heated for upwards of an hour, but gave no trace of reduction.

In considering this last series of experiments, we see that the action produced by the insolated tubes on the sensitised papers is in no way due to heat.

Now, is it due to the action of light that we may believe to be stored up in the paper? No; because if we interpose a very thin plate of glass between the tubes and the sensitised paper, no reduction is obtained even after four days' contact.

To sum up: the reduction of a sensitised paper submitted to the action of an insolated tube is not due either to the action of heat or to the stored-up light, but to a peculiar volatile substance formed when certain salts and certain acids are submitted to the action of light in the presence of an organic matter.

Judging from special researches commenced some time since, we believe we are in a position to announce that this body, or this powerful reducing agent, will shortly be known, at least in its properties.

THE COMPARATIVE TRIALS OF PHOTOGRAPHIC LENSES.

BY T. GRUBB, M.R.I.A.

THE observations in my letter of 13th ultimo (published in your number of the 21st April) were confined to that portion of the late examination of the Petzval and Voigtlander lenses, which affected these when arranged as *portrait combinations*. It remains to offer a few remarks on the trial of the same lenses arranged as *view*, or orthoscopic, combinations.

Here, as in the former case, the data recorded (or, at least, published) are not as full as could be desired. The focus of each lens is stated as being "about" 30 inches, and the apertures used the "full," but whether the latter were equal, or nearly so, is not mentioned; the distance (from the lenses) of the objects 88 inches; and the objects appear to have been two similar paragraphs cut out from newspapers, and placed 15 inches apart. One camera only being used, and the lenses attached to it, each one in succession for trial.

The most obscure part of this account is that relating to the objects, or rather the manner in which they were used for ascertaining the relative degrees of perfection of the lenses at different portions of the field. The most likely conjecture is, that the camera was placed directly opposite one of the paragraphs; the image of the second being used for comparison of the lateral pencils of the lenses. In such case it would be desirable to have a third paragraph, the lens being placed directly opposite the central object. Supposing, now, that three such paragraphs were used and placed on the screen, at the distance of 15 inches each, the entire distance would be but 30 inches, and the lenses being placed at 88 inches from the objects, the angular field, included by the camera, would evidently be that which a linear dimension of 30 inches includes at a distance of 88 inches. This is just 20 degrees, being only one half of that which a good new lens should bear with adequate distances; it is, in short, equivalent to a field of only five inches linear, for a focus of 15 inches, and quite insufficient for testing the performance of a lens in respect of its capabilities for affording that extent of field, with adequate distances, now sought for by photographers. I conclude, therefore, that some other means than that indicated in the account given was resorted to for ascertaining the relative distinctions of the lateral pencils of the lenses indicated.

The same indiscretion with respect to distance of the lens from the objects, which I adverted to as occurring in the trials of the portrait lenses, have also occurred in the trials of the view combinations. A lens of 30 inches principal focus, placed at 88 inches from an object, will have the focus for that object lengthened out to more than one half additional, say 45 inches instead of 30 inches. The angular aperture (of the lens to the image) will be reduced to ⅔rds, and the intensity of the image to 4/9ths. Under such circumstances the conditions present differ so far from those occurring in ordinary practice, that the experiments are at best fitted for comparative estimation, and that only for the actual lenses under trial. It is right that I should admit here, that the trials were avowedly only intended as such, and I trust it will be understood that my criticism on them has been communicated not as finding fault with the trials themselves, but rather as suggestive of future trials being so conducted as to prove more generally useful, by making the conditions (as nearly as can be done with convenience) similar to those occurring under ordinary practice, and by communicating a more ample record of these, and of the results.

Dublin, May 4, 1859.

THE ALBUMEN PROCESS.*

BY P. C. DUCHOCHOIS.

MANY substances have been proposed to destroy the tenacity of coagulated albumen, and to render it more favourable to photographic preparations, by giving it greater sensitiveness. But nearly all such substances, besides their solubility, which admits of their employment only in very small quantities, have their peculiar inconvenience; thus, dextrine, or soluble starch, tends to render the albumen film more subject to scale or split; honey keeps it in too damp a state, and sugars very easily establish the fermentation of albumen, and thus prevent its solution being kept. I thought that the substance the best suited for albumen preparations would certainly be that which possessed the following properties:—

1st. To become insoluble when in contact with diluted acids.

2nd. To prevent, like sugars, the crystallisation of the alkaline, iodide, and bromide, by maintaining the layer of albumen in an incomplete state of desiccation.

3rd. To add to its sensitiveness, by its tendency to reduce the silver salts.

Such is *glycyrrhizine;* and experience having confirmed me in all that I had expected of its union with albumen, I present you with the following as one of the quickest, giving very fine and harmonious proofs:—

Albumen—

White of egg	1 ounce.
Solution of glycyrrhizine	3 drachms.
Iodide of ammonium	6 grains.
Bromide of ammonium	4 ,,
Iodine	1 ,,

Dissolve the iodide and bromide in the glycyrrhizine, add the iodine and white of egg, heat till a thick froth is obtained, and let settle.

The glass is coated with this albumen according to the ordinary process, or spread on a sensitive collodion film as in the Taupenöt process, when, of course, the sensitiveness is still greater.

Silver bath—

Water	1 ounce.
Nitrate of silver	40 grains.
Iodide of ammonium	½ ,,
Acetic acid	40 minims.

Developer—

Water	1 ounce.
Strong alcohol	½ drachm.
Gallic acid	to saturation.
Acetic acid	5 minims.

Before using this solution, add a few drops of a 20 grain nitrate of silver solution, and 2 or 3 minims of a 25 grain solution of acetate of lead.

Solution of Glycyrrhizine.—To make this, boil for several

* Read at the Inaugural Meeting of the American Photographic Society.

hours 1 pound of liquorice roots in 25 ounces of serum of milk; filter, and evaporate the solution to 10 ounces. It would, without doubt, be better to prepare pure glycyrrhizine, but the above solution answers well the purpose.

Critical Notices.

Photographs taken at the Cape of Good Hope. By MR. JOHN SIMPSON. London: Bland and Co.

THE collection of views before us are taken from wax paper negatives, and, when we consider the fact that they are among some of the earliest attempts at photography in that far distant colony, and take into account the difficulties which amateurs must necessarily have to contend with, we must express our admiration at the results of Mr. Simpson's efforts. Photographers who reside in and near London, in these days of fast travelling, can ill judge of the almost insurmountable obstacles which must constantly be presenting themselves to the colonial photographic amateur. Imagine, for a moment, an operator being three months without hypo.! After having duly exercised that virtue which it is said is rarely found in the female portion of society, and never (?) in the male portion—patience, imagine him again having to pay an exorbitantly high price for it when procurable. These are among some of the trifles which are likely to damp the ardour of an enthusiastic photographer. Judging from the Indian views by Dr. Murray and Mr. Hamilton Clarke, which were exhibited in the Society's last two exhibitions, we have no hesitation in pronouncing Mr. Simpson's, in many respects, far superior. They are clearer in tone, and give much greater detail. Indeed, so fine is this feature in some instances, that we have often seen collodion pictures far inferior. Of course, there is apparent in the views before us, the fact that they were taken in rather a strong light, a great intensity of black and white occasionally occurring. The architectural views are very good indeed; and the selection of the sites often evince great artistic taste. From the landscapes it would be unfair to expect much, seeing that definite detail in the distant perspective is, generally speaking, almost impossible in paper negatives. Such a series of photographs as these would prove an interesting feature in a photographic exhibition, considering that there now seems to be such a rage for anything "South African," in spite of the warning picture constantly before the eyes of metropolitan omnibus travellers, depicting the agonised faces of three individuals who were induced to taste "South African," (popularly believed to be a votive offering from the survivor in order to save others from so dreadful a fate).

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

Progressing with the Picture.—During the progress of the head, it will be necessary to proceed also with the drapery, &c. The consequence of completing any one part before a general impression of what the picture is intended to be has been produced, is to disappoint the eye by making it appear more finished before the back-ground and draperies are painted than after. Then, first complete your background, next your draperies, and, lastly the head.

Do not materially alter the tone of any part, especially the background; for supposing it were made much darker than the shadows of the face justify, this would entail the necessity of making your head deeper also, or it would look flat and unfinished.

Finish.—We shall now make such suggestions as may be calculated to complete a portrait which has gone through the preceding stages.

A little Chinese white mixed with lake, and worked in a few places over the cheeks, will give much sweetness to the colour—that healthy red found upon peaches. A few touches of the same, rather paler, upon the lips and ears in a few places. In very deep ruddy faces, burnt sienna and lake with white, or red chrome, vermilion and white, or red chrome and vermilion alone, may be used for the same purpose. On the forehead of a very fair face, a little pure white may be thinly touched on in the high lights, &c.

Touch in, with gum and lamp-black, the black pupil in centre of iris; afterwards, with Chinese white, the bright point. Then, with lake and ivory black, touch in lines faintly to define the eyelids and shadows of eyebrows, line between lips (faintly), locks of hair over face, if any, &c. Any shadows cast by locks of hair, &c., upon the forehead or cheeks, may be coloured warmly with a colour made of vermilion and madder brown, edged into the light flesh with a blue or purply-grey. See Lawrence's heads for this.

For the deepest shadows throughout the head, use madder-brown, which, worked over the *previously light warm* colour, will give a good effect.

Where a little purer blue is required, or any pearly tint wants sweetening, use a little white mixed in the colour, and, with medium, touch delicately upon the part; this will produce any delicacy of tint.

Light and Shade.—It is difficult to understand *why* things appear as they do, and are what they are. We often, on seeing a picture, exclaim—"How very good!" "What fine relief!" "How true to nature it seems!" yet seldom stay to discover how or why it is so. No one can represent well that of which he does not thoroughly comprehend the meaning.

The cause of some really good photographs representing life so well is, that in them the effect is produced by similar means as in the *real object*. Now an object is made to appear relieved much from this cause; the lights and shadows in the front are in stronger contrast than in those parts which recede, the outline is bolder and more telling, whilst those parts that retire are softer, neither lights nor shades so strong, while the extreme edges are so soft, as at an ordinary distance to be not plainly traceable. Hence not making much impression upon the eye, those parts recede back; and at the same time, owing to the fact that those parts which do come out, make a strong impression upon the eye, they appear to stand in relief. It cannot be occasioned by the same sensation of touch, as in the case of blind people, who receive impressions of things by the feeling of touch, that we know a thing to be round; because we feel confident that certain things we see are round, without approaching to touch them. So in a sharp photograph, which is really flat, the effect is that of relief, because the lights and shades are graduated just as in the life.

It is the more necessary to speak of this, as ignorance of such things is the cause why many make such flat, hard pictures. They make the outside lines too palpable, and do not keep up sufficient force in the front parts of objects, destroying all the charm and appearance of reality, which proves plainly they do not understand what they are doing.

It will also be observed there is a reflected light softening all the sides and edges of objects in shadow. This reflected light will be found under all circumstances to soften those lines, which, being shadow, would cut hard and black against anything light behind, if it were omitted in a picture, also materially conducing to the soft impression, which, in nature, pervades all things. Unskilful painters have sometimes the shadows down one side of the face, or a coat cutting hard against a background, thereby breaking up all appearance of relief and softness.

Further, there is a principle called "keeping," which means, the just balancing of all the lights and shadows throughout a picture or in a face, so that they do not anywhere seem to startle us. If one part be made too dark for the others, *i.e.*, darker than necessary to make out the form of whatever it is upon, that will at once throw all the rest of the shades, &c. out of use, and itself appear dirty.

A most perfect picture may be destroyed by introducing three or four harsh touches about any feature; or by making the light, or certain portions of a face too bright.

It will appear from this how much attention to light and shade is necessary to preserve fidelity of likeness; for a photograph is no other than a mass of delicately graduated

lights and shadows. Then, by the better understanding what produces these lights and shadows, it will appear what consequences may be expected to result from a deviation from any of them.

(To be continued.)

Dictionary of Photography.

CHLORIDE OF SODIUM.—This important photographic salt is formed of equal equivalents of chlorine and sodium. It is commonly spoken of as *salt*, although, as we have before explained, this term is now applied to the whole series of such compounds of electro-negative with electro-positive bodies. It is extracted from sea water by evaporation, and then is known as marine salt. It also occurs as a mineral in the earth, whence it is dug up, and goes by the name of rock salt. As marine salt frequently contains impurities, and clear colourless fragments of rock salt are to be easily obtained at a trifling expense, it will always be better to employ the latter form of chloride of sodium in all photographic experiments, as then its purity can be relied on. It is largely used for the preparation of positive paper; it may also be used instead of bromide of potassium for temporarily fixing negative pictures, and it is also of great use in precipitating silver residues to the state of chloride of silver, which may afterwards be reduced to the metallic state by any of the methods previously described in our articles on the reduction of silver residues.

CHLORIDE OF STRONTIUM.—This is a whole crystalline salt, composed of equal equivalents of chlorine and strontium, which, from its solubility in alcohol and ether, we have frequently employed for the purpose of adding to collodion, with the object of experimenting on the effects produced in the sensitive film by the entire or partial substitution of chlorine for iodine or bromine.

CHLORIDE OF ZINC.—A salt composed of equal equivalents of chlorine and zinc. It may be made by dissolving zinc in hydrochloric acid, and evaporating the solution to dryness. It is one of the most powerful attractors of water known, and is, on this account, used in cases where the affinity of chloride of calcium for water is not strong enough. Chloride of zinc in solution forms a very useful *soldering fluid*, and in this state a bottle of it will always be found valuable in the laboratory.

CHLOROFORM.—This is a heavy volatile fluid composed of chlorine, hydrogen, and carbon; its formula being $C_2 H Cl_3$. It is obtained by distilling chloride of lime and dilute spirits of wine. It possesses a powerful ethereal odour, and well-known anæsthetic properties. It is as a solvent, however, that it is best known to photographers, being one of the best solvents for many of the gums, caoutchouc, and gutta percha. It has been (and will, doubtless, be more) applied to the manufacture of rapidly drying varnishes for collodion pictures, to which its comparatively low price and powerful solvent properties make it eminently fit. Mr. Shadbolt has also used and recommended it to be added to collodion in the proportion of a few drops to each ounce, for the purpose of destroying the reticulated appearance due to the employment of inferior pyroxyline or dilute alcohol.

CHROMIC ACID.—This acid is composed of one equivalent of the metal chromium and three of oxygen; in symbols, $Cr\ O_3$. It may be very readily prepared by decomposing chromade of baryta with dilute sulphuric acid, adding the acid in only just sufficient quantity to precipitate the baryta. It forms blood-red crystalline needles, which are soluble in water, but are decomposed on contact with any organic substance, such as filtering paper, the skin, &c. Chromic acid unites with bases, and forms a well-marked series of chromates. These salts are characterised by their yellow or red colour.

CHROMATE OF LEAD.—A beautiful yellow precipitate formed when a soluble chromate and a soluble lead salt are mixed together. It is largely used in painting.

CHROMATE OF COPPER.—Prepared by precipitating a salt of copper with chromate of potassa, or by dissolving hydrated oxide of copper in chromic acid. Caustic ammonia dissolves this salt, forming a beautiful dark green liquid, from which, by the addition of spirits of wine, ammonio-chromate of copper is precipitated in the form of a dark green powder. This salt was first applied to photographic purposes by Mr. Hunt, who employed it in the *chromatype* process.

CHROMATE OF POTASSA.—A salt composed of equal equivalents of chromic acid and potassa; it is a yellow crystalline compound, soluble in water, and only of interest to the photographer as serving to precipitate the various metallic chromates.

(To be continued.)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS—(*continued*).

Q. What was the result of these experiments in fixing photographic proofs?

A. In the first place fixing and toning, which are too frequently regarded as a single process, was separated into two operations.

Q. What method was suggested as the best for fixing?

A. First of all to remove from the proof all useless materials; these are—an excess of nitrate of silver, the soluble salts contained in the silver bath, such as alkalines, &c., and the chloride of silver not affected by the light.

Q. How is this operation effected?

A. Nitrate of silver and alkaline salts are soluble in water, the proof is therefore washed twice in a basin of common water. This washing in two waters presents, as we have seen, numerous advantages; first, it permits the collection of the largest part of nitrate of silver which has been decomposed by the preceding operation; it facilitates the immersion in the fixing bath, as without it the proof is more likely to be affected by air bubbles; and, finally, its chief advantage is that it betrays the reaction of the nitrate of silver upon the hyposulphite of soda.

Q. What is done with the proof after these preliminary washings?

A. After being thoroughly washed it is necessary to remove the chloride of silver which still remains in the proof. The agents generally employed are hyposulphite of soda and ammonia. Both of these are successful, but the hyposulphite of soda is usually preferred. A few minutes will suffice to fix the proof, which must then be washed again and again, until it is made perfectly free from any extraneous matter.

Q. How is the second operation performed?

A. After fixing, it is important to modify the disagreeable reddish tone of the proof. The methods of imparting tints are as numerous as the tints are varied. The conductors of the experiments that have been detailed, did not especially direct their attention to these different methods of tinting, leaving these to the taste and experience of the operator. They, however, recommended the use of the sel d'or, as it agreeably modified the tint and imparted solidity to the image.

Q. What conclusions were arrived at by the result of these experiments?

A. The conclusions arrived at were:—

1. That the positive photographic image, in the ordinary process by chloride of silver, formed by pure silver.

2. That new and pure hyposulphite of soda, properly used, does not leave any appreciable traces of sulphur, after thoroughly washing the proof.

3. That the cause of the darkening and discoloration of proofs is the sulphuration of silver; all the discolorations, directly or indirectly, being traceable to the same cause.

4. That the fixing should always be conducted separately

from the tinting. That in fixing all matter should be carefully removed which does not assist in the formation of the picture. That in tinting the use of sel d'or is to be recommended.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 3, 1859.

We will now resume our remarks on the Exhibition of Photographs at the *Palais de l'Industrie*. A great many proofs that were sent to be exhibited were refused by the committee; and all have been submitted to the examination of a special jury, composed of members of the *Société Française*. Since our last visit some photographs by Mr. F. H. Morgan, of Bristol, have been hung up. This gentleman's name is not down in the catalogue; by some inconceivable error on the part of his French correspondent, Mr. Morgan's proofs have only just arrived. "Better late than never," for this artist's trees do him much credit, and have been admired by his brother photographers on the Continent. They are remarkable principally for their boldness, the minuteness of detail, and the *ensemble*, which is generally very good. Mr. Morgan's subjects are well chosen, and may rank among the best landscapes in the exhibition. They are small proofs from collodion negatives.

The Count Aguado, member of the French Photographic Society, has exhibited similar photographs; his "Paysage et Etudes d'Arbres," on waxed paper, and, better still, his "Etudes d'Arbres d'après Nature," taken on wet collodion, deserve especial mention. The trunks of the large oak trees come out well with all their details, and these proofs have a reddish-brown tint that makes them agreeable to look at.

Viscount Aguado, another member of the French *Société*, has exhibited some very good photographs also. One of the best is his well-known reproduction of a drawing from the beautiful picture by Winterhalter, representing the Empress of the French surrounded by her maids of honour.

M. Naya, of Venice, has enriched this exhibition with some most beautiful photographs. In all, eleven proofs, of which eight are Italian views, and three, reproductions of engravings from works by Titian and Paul Veronese. The "Bridge of the Rialto," and the "Bridge of Sighs" (Venice), are, perhaps, the most perfect photographs in this artist's collection. Venice, as our readers know, is built upon 72 little islands, possesses more than 500 bridges, of one description or another. Of these the most beautiful are, doubtless, the "Rialto" and the "Bridge of Sighs." They form splendid subjects for the photographer, and we may add, the brilliancy of an Italian sun shines out in M. Naya's proofs. The "Rialto" was commenced in the year 1588, by the great Michael Angelo, and finished in 1594. It consists of one flat and bold arch of nearly 100 feet span, and only 23 feet above the water. This gives it a peculiarly striking aspect, and a stranger on arriving at Venice would immediately recognise the "Rialto," which, in Shakespeare's time, was considered the most beautiful bridge in the world. The whole exterior of the bridge, as well as that of the shops built on it, is of marble. Another beautiful photograph by M. Naya is a representation of the "Principal Gate of St. Marc," and we should mention likewise his "Basilic of St. Marc." The other proofs exhibited by this artist are very fine, but rather too dark to please us.

Another important *desideratum* for photographers struck us to-day. In most of the proofs in this exhibition where *water* is represented, it has spoiled the effect of the whole. The water that flows under M. Naya's "Bridge of Sighs" has succeeded tolerably well; but, after all, it is *not* water; it is something flat, smooth, still, brilliant, or velvety, resembling rather a sheet of polished metal or a board of varnished mahogany; but it is not *water*. We believe this bad effect is generally to be attributed to over-exposure. If the watery parts of a landscape, for instance, could only be submitted to a shorter exposure than the *terra-firma*, trees, figures, &c., we think, *a priori*, that better results would be obtained. We all remember how difficult it was at first to produce good clouds and skies: but the difficulty was conquered more than two years ago in England, and has been since overcome on the Continent.* The skies of M. Warnod, for instance, of whom we shall have occasion to speak presently, are very perfect representations of nature, in comparison to what that photographer would have produced some little time back. We wish we could say the same for *water*. One exhibitor has, however, "hit the nail upon the head." We mean M. Gaillard, of Paris (member of the Society). He has exhibited a landscape—a positive on glass, which is seen by transparency. Here *is* water!—real water, and no mistake about it; but the tree-stems are transparent too!!

The reflection of objects in the water adds much to the transparency of the latter in a picture. How is it, then, that photographers do not avail themselves more of this circumstance?

We mentioned, just now, the name of M. Warnod (of Hâvre). This artist has exhibited a considerable number of portraits. We do not think we could point out a bad one among them. They are mostly remarkable for what the French call *modélé*—good tone, softness, and *relievo*. His marine views, taken at Hâvre, deserve notice on account of the perfect manner in which the clouds have been obtained; but, on the other hand, objects such as ships, figures, piers, &c., are over-developed in more than one proof.

Messrs. Pesme and Varin, who exhibited many excellent productions at the Brussels Photographic Exhibition in 1857, have sent to this collection some very good portraits—of the very kind which, of all others, we should prefer for the walls of our drawing-room. The back-ground is light; a slight shade only surrounds the figures, and aids in giving them the necessary *relievo*. Seen from a little distance, these proofs resemble fine pencil drawings rather than photographs.

M. Pesme did not think, perhaps, that the same humble critic who admired his photographs at Brussels in 1857, would be on his track again at Paris in 1859! We recognise in his proofs some of our old Brussels friends—but they are aged! they are fast fading away. They pleased us at Brussels, and we spoke well of them on account of their lightness; they are rather *too* light here, and we fear that if ten years instead of two had elapsed since we first saw them, they would have disappeared altogether! We hope M. Pesme will take the hint. He has hit upon a method of obtaining artistic photographs that please everybody; but if he is not stopped in time, he will go to extremes and produce a quantity of pale-faced images that will cause a very contrary effect.

M. Silvy, member of the French Photographic Society, has exhibited a frightful-looking object—a portrait of the King of Sardinia. The next panel ought (according to the catalogue) to have contained a portrait of the Queen of Sardinia (which we should have looked at with more pleasure); but, probably terrified by the awful appearance of her husband, she has fled, and the panel is empty. On the other hand, M. Silvy's portrait of himself is one of the best photographs in the exhibition. It is a three-quarter portrait; he is standing in an easy position; he has a thick stick in one hand, and conceals the other in the pocket of a loose coat, the folds of which are admirably rendered. M. Silvy has exhibited a number of other proofs, which are not bad, but do not entitle him to a more special notice here.

We ought also to mention M. Le Gray's portraits, which have attracted considerable attention, in most cases very de-

* According to a letter that has been placed in our hands this morning, it would appear that M. Warnod had succeeded, as early as 1850, in producing clouds and other objects in motion.

servedly. His photographs are remarkable for their *modélé*, roundness, and softness. He has also sent a view of the French camp at Chalons—a large photograph composed of six proofs—and some other works, among which a view of Paris from the *Pont Royal*.

M. Fierlants, of Brussels, has exhibited no less than 68 different proofs, most of which are copies of pictures and drawings of the fifteenth century from the schools of Bruges, Brussels, Antwerp, and Louvain. All these have been photographed on wet collodion, except the copies of drawings and engravings, which were made on albumenised collodion. The reproduction of some of the larger pictures was obtained with an objective, manufactured by MM. Voigtlander, called an "orthoscopic objective," and having a focal distance = 1 metre 45 centimètres.

We shall continue, in our future letters, our critique of this splendid exhibition; but we must call the attention of our readers once for all to the following observations. It is impossible, with our limited space and time, to speak of everything at once. We would beg of them also not to imagine that the productions of one photographer are in our judgment superior or inferior to those of another, because his name comes foremost or latest in our notice. We have not thought proper to confine ourselves by any method which would have compelled us to take every photographic artist in his turn according to his merit—a thing which in the present collection at the *Palais de l'Industrie*, would have been as impossible as to have written them down alphabetically, as the catalogue has done. It remains yet for us to notice some of the most remarkable photographic productions in this truly wonderful exhibition.

M. Bertsch gives us the following description of a new process for engraving photographically, suggested by M. Berschtold. A glass is covered with a thin layer of any opaque substance; on this is traced, with a pointed instrument, a number of fine parallel lines, very close one to another. When the piece of steel to be engraved has been covered with bitumen, and exposed in the camera (as in the process now in use) before submitting it to any solvents, the negative is taken away and replaced by the streaked glass. Wherever the bitumen has been rendered insoluble by the action of light, no further change is observed to take place. The stripes of the glass are represented, however, with an intensity depending upon the degree of insolation undergone by the bitumen. This intensity increases according as the different parts of the bitumen have been less insolated.

The striped glass is then turned so that its lines may run in a direction perpendicular to the first, and a new insolation ensues, but the latter is only of half as long duration as the preceding one. This same operation is repeated over and over again, the lines on the glass being placed in a *diagonal* direction, then in an intermediate position, and so on until a fine *grain* has been produced.

In those places where the action of light upon the bitumen was complete in the first instance, *i.e.*, in the *lights*, no streaks are produced, however often the successive insolations have been repeated; but, on the other hand, these streaks are photographed on the parts which constitute the half-tints and the shades, in a proportion which coincides exactly with the quantities of ink these several parts should receive. Thus, for instance, the darkest shades obtain the maximum quantity of streaks, *i.e.*, the entire quantity of streaks produced by the successive insolations; and whilst the lights which have received no streaks at all remain pure, these dark parts will give an intense black.

"This new process will, doubtless," says M. Bertsch, "give far better results than the old method, which consists in covering the bitumen (which has been insolated, and then treated with an appropriate solvent) with a fine powder of resin to cause the production of a *grain* and to make the ink adhere better, and lastly by eating away by an acid, &c. For, in this manner of operating, the resin that has adhered to the light portions must be removed by the artist. Often, again, the resin which remains has to be covered with a varnish. Now all this requires skill. M. Bertschtold has endeavoured, in his process, to render skill almost unnecessary, and to let light act by itself and do all the work."

M. Nachet, of Paris, has lately constructed a new kind of microscope for photographic objects (*mikro-photographes*). It is a simple lens for producing very small photographs of large objects. In fact, it may be termed a kind of microscope destined to render exterior objects much smaller than nature, instead of magnifying them. The photographs produced by the aid of this instrument can only be seen with the aid of a proper microscope.

A slight error has slipped into our last communication. The quantity of platinum fused at once by MM. Deville and Debray was rather more than 23lbs., and not 23,000lbs. The crucibles M. Deville employs in his metallurgical operations are made of lime or of carbon. In the latter case, it is the carbon obtained from the gas manufacturies, and which is also used in the construction of Bunsen's pile. As M. Deville's memoir is not yet published, we have not been able to enter into more details concerning his analysis of platinum ore.

Tungsten is a metal which has been hitherto little studied in a practical point of view. It appears, however, destined to operate a complete revolution in the manufacture of steel. It has been lately discovered that an alloy formed of 80 per cent. steel, and 20 per cent. of tungsten, possesses a degree of hardness which has never been obtained in the manufacture of steel. This alloy works upon the latter with incredible facility, and can even cut it. Experiments have been made with this new composition at Vienna, at Dresden, and at Neustadt, Ebertswalde, and considerable quantities of the alloy in question are, it is affirmed, being manufactured in that part of the world. Many old tin mines have been bought up with a view of extracting tungsten ore, and considerable prices have been paid for some that have not been worked for a long time.

PEOPLE IN THE MOON.

To the Editor of the "PHOTOGRAPHIC NEWS."

DEAR SIR,—It must, I am sure, be a source of great gratification to your numerous readers to find that "Mr. Barkas" is willing to show us so much more than anybody has yet seen of the surface of the moon.

Perhaps I may be permitted to draw the attention of that gentleman to a circumstance which appears to have misled him in his calculations. The highest power that can be applied with advantage to lunar observations is about 240, so that in representing the observer to have a power of 1,000 at his command, a very grave error is committed.

With regard to the *rat* Mr. Barkas so obligingly offers to exhibit, I confess that my own impression is, that on attempting the operation, the only result from the lunar "*mons*" would be a "*ridiculus mus.*"

In conclusion, allow me to place at Mr. Barkas's disposal any number of transparencies of the moon he may wish; and should he obtain anything at all approaching the result he so confidently asserts, no one will be more gratified than myself.—Yours truly, SAMUEL FRY.

79, *King's Road, Brighton, April* 25, 1859.

Photographic Societies.

LONDON PHOTOGRAPHIC SOCIETY.—R. FENTON, Esq., in the Chair.

AFTER the minutes of the proceedings at the last meeting had been duly read, Mr. Malone rose to ask a question relative to the suggestion he made on that occasion, that certain chemists should be added to the Committee appointed to test the relative merits of different kinds of collodion; in reply to which, he was informed, that Mr. Spiller had been summoned, but had written

to say that he had not time to attend; and Mr. Heisch had written to the Secretary that he had neither "the time nor the inclination to do so," and, moreover, he considered, that a great liberty had been taken in proposing his name without his consent. A reply with which Mr. Malone expressed himself satisfied, though what satisfaction he could derive from such a reply was not very easy to discover.

Mr. MAYALL then rose to read a paper on the subject of the collodion used by him. It was of considerable length, and full of such minute detail, that it is almost impossible to give an analysis of it. We have, therefore, thought it best to lay the paper itself in an unabridged form before our readers. This, through the courtesy of Mr. Mayall, we are enabled to do in the present number (vide p. 97).

The CHAIRMAN invited Mr. Hardwich to express an opinion on this paper.

Mr. HARDWICH was not prepared to express an opinion on the paper he had just heard read, but proceeded to give one notwithstanding. He took an objection at the outset to the use of paper as a substitute for cotton in the manufacture of pyroxyline, on the ground of the paper being liable to be contaminated by the admixture of different foreign substances. He thought that the quality of the collodion depended chiefly on the pyroxyline, and that in order to produce a perfect collodion it was advisable to direct attention mainly to the finding of an uniformly good and pure gun-cotton. As regarded the iodide of magnesium, he did not think Mr. Mayall interpreted its effects rightly; besides which, he thought it would be difficult to obtain it in commerce in a state of sufficient purity, whereas iodide of potassium could be readily purchased in that condition, and gave results which he considered fully equal. The plan he would recommend travelling photographers to adopt with respect to their collodion, would be to carry the plain collodion in one bottle, and two iodisers separate—one containing an iodide and the other a bromide, and so iodise the collodion in small quantities as required. He described an experiment he had made with iodide of magnesium, in which he had failed.

Mr. DAVIS rose to call the attention of the society to what he considered a curious fact he had recently met with relative to collodion. He had made some, in which he had used iodide of potassium and iodide of cadmium. On the addition of the iodiser it had assumed a yellowish colour, as usual, which gradually deepened to a red; but ultimately cleared itself, and became colourless. He attributed this to the iodide of potassium being of an alkaline nature, and the iodide of cadmium acid, and to a consequent reaction of some kind. He went on to remark on the difficulty there was in getting nitric acid of a certain strength, &c.

Mr. WILLIAMS next offered some observations, in reply to Mr. Hardwich's remarks, on the difficulty of manufacturing iodiode of magnesium of sufficient purity to be available for photographic purposes. He stated that he had met with no such difficulty; and, as an illustration of this, Mr. Mayall handed two bottles about the room containing, respectively, iodide and bromide of magnesium, which Mr. Williams had prepared for him. Mr. Williams did not say that he shared Mr. Mayall's opinion, as to the effect of the iodide or bromide of magnesium in the collodion. He concluded by stating a fact which excited considerable sensation among the members present. He had had forwarded to him, by a manufacturer of collodion, twenty Winchester quarts of collodion residues, for the purpose of recovering the ether, which he effected by the ordinary process of distillation; after which he continued his operations for the purpose of recovering the iodine. When he had terminated his labours he found, to his great surprise, that the residiuum contained a sufficient quantity of oxalic acid to yield him no less than one pound five ounces of oxalate of lime. Mr. Williams (though an exceedingly skilful chemist) could not at present explain where this oxalic acid came from, but contented himself with announcing the fact to the society.

Mr. HARDWICH suggested various methods of explaining the phenomenon, all of which were disposed of by Mr. Williams, and the conclusion arrived at, if conclusion it could be called under the circumstances, was that it was a very extraordinary phenomenon, but that at present it was inexplicable. It was generally agreed, however, that this might account for some of the difficulties which photographers met with in the practice of their art.

Mr. MALONE differed entirely from Mr. Mayall as to the superiority of paper over cotton wool in the preparation of pyroxyline. He had himself visited at a paper-mill for a fortnight, and knew all about the process, and he could positively say that no two specimens of paper were likely to be identical in their constituent parts. Paper was a most indefinite compound, and therefore a very unfit substance to be used in the manufacture of collodion. Cotton-wool gave results which were not always identical, but, at all events, it was a much nearer approach to a definite chemical compound than could be obtained by the use of paper; and he agreed with Mr. Hardwich that improvements in collodion were more likely to be effected through the pyroxyline than from any other means. He ridiculed the idea of iodide of magnesium acting as a preservative of the collodion from decomposition, by absorbing the water therein, and pointed out sundry strong reasons why such a collodion as that proposed by Mr. Mayall *could not* be a good one.

Mr. SHADBOLT said that Mr. Mayall, in referring to him, had mistaken the smile of approval on his face for one of derision. He did not intend to criticise the formula given by that gentleman for making collodion; but he could not help observing that the developer which he directed to be used with it (a decoction of iron nails with an admixture of sulphuric acid) was the same as that suggested by M. Martens, of Paris, more than two years ago.

Mr. MAYALL then rose to reply to the objections which had been urged against his formula. His horror of mixtures was as great as ever it was, but he must deny that his collodion was a complicated mixture; on the contrary, its manufacture was characterised by great simplicity. He asserted that paper, such paper as he used (Whatman's blotting-paper), was always the same; that he had used it for years, and had found no difference in the quality of the pyroxyline obtained from it. He dwelt at some length on the effect of various iodides and bromides in collodion, and persisted in the view he had taken of the part played by the iodide of magnesium. He urged those present who might be going into the country on a photographic tour not to be dissuaded from using his collodion by mere theoretical objections, but to do as their worthy chairman proposed doing, give it a trial; and he was sure that those who did so would not in future return with a very few good negatives and a great many bad ones, but with very few of the latter and very many of the former. He had used it himself for years, and with uniformly good results; and, therefore, however objectionable its mode of manufacture might be theoretically, practically it was the very best he had ever tried. In conclusion, he might observe, that it could not be supposed that he had any object in view, beyond the desire to see the beautiful art they all loved carried to the highest pitch of perfection to which it was susceptible. (Mr. Malone, interrupting, "Not smothered with paint!"—Laughter.) Mr. Mayall did not understand the allusion, and, after a few further remarks, he sat down.

The CHAIRMAN congratulated himself on his prescience in foreseeing that the paper which had been read that evening would give rise to an interesting discussion. He was sure that all who had listened to the observations that had been made, must have been deeply interested. For his own part, he must confess that he was not a scientific photographer, and was grateful for the light which scientific men threw upon the practice of his art. At the same time, he could not help observing, that there were many things which occurred in the practice of photography which science could not explain, or, rather, it did not do so. In practice, he met with many obstacles which no scientific theory would enable him to surmount; and he was, therefore, compelled to apply such remedies as suggested themselves to him at the moment; and he must add, that these were frequently successful, though, possibly, scientifically speaking, they had no right to be so.

Mr. MALONE rose at the conclusion of the chairman's speech, and attacked him with considerable warmth and vehemence for making use of such heterodox language. He asserted, that it was to the chairman, and men like him, who spoke contemptuously of the theoretical photographer, that scientific men, who studied the subject, owed many of the difficulties they encountered; and which difficulties would never have arisen, if the practical photographer had had the slightest knowledge of the elementary principles of chemistry. In fact, it was the haphazard manner in which purely practical photographers went

to work to remedy what they considered a fault, that produced the very difficulties of which they complained, to which scientific men were unable to find a solution. He did not impute the prevailing ignorance of chemistry to him as a fault, inasmuch as it was not the practice in this country to instruct youths at school in that science, as it ought to be. At the same time, he must protest against the labours of scientific men being sneered at, as was too frequently the case among men who termed themselves practical.

The CHAIRMAN replied, in an extremely good-humoured tone, that he submitted to the rebuke that had been administered to him, although he had not the least intention in what he said to question the value of the services rendered to photography by scientific men. Nobody was more deeply impressed than himself with the obligations they were under to those scientific members of the Society who devoted their time and talent to the advancement of the photographic art, but he must repeat, that photographers met with difficulties in practice of which those who simply followed it in theory had no conception; and he further thought, that if any grand discovery was made in photography, it would be due to the practical man, and not to the mere theorist.

The conclusion of the amiable Chairman's speech was received with considerable applause; after which the meeting broke up.

Miscellaneous.

PHOSPHORESCENCE OF GASES.—We would direct our readers to the following experiments by Edmund Becquerel, as they are a first step in the direction of the study of the phosphorescence of gases, a subject hitherto unexplored:—" M. Ruhmkorff drew my attention to the fact that, in certain tubes, containing only rarefied gases, which had been sent to him by M. Geissler, there were visible, after an electric discharge, certain luminous appearances, continuing but a few seconds, and resembling those emitted by the phosphorescent materials I was then using in my researches. From this I was led to study the passage of electrical discharges through rarefied vapours and gases, causing, as is well known, certain effects of colour, dependent on their nature, in order to discover what are the particular gases which yield the effect of luminous duration, and whether these phenomena are similar to those of phosphorescence observed with the use of solid bodies. In most of the tubes containing such gases as hydrogen, sulphuretted hydrogen, protoxide of nitrogen and chlorine, a faint light is observed, remaining after the passage of *electricity of induction*, or even after a simple discharge from an electric battery, but the effect appears confined to the interior surface of the glass tube. It is not caused by the phosphorescence of the glass; for tubes, exposed to the action of a bright light, and then placed in the dark, exhibit no effect of this kind, and the use of the phosphoroscope is necessary in order to ascertain what results are due to the glass, which are found, however, to be more evanescent than those following the action of electricity. The effect exhibited by the tubes containing these gases appears to result from an electrisation of the glass, or of the layer of gas adhering thereto. With oxygen a different effect is observed, when shocks from a powerfully charged induction apparatus are passed through a tube containing this rarefied gas. If the passage of the electricity be suddenly arrested; the tube appears illuminated with a yellow tint, which continues some seconds after the interruption, and goes on decreasing, more or less rapidly, according to laws which as yet I have been unable to determine. To make the effect more manifest, the electricity passed through the gas must have a certain amount of tension. It is also preferable to interpose a condenser in the current, and to cause sparks to pass at intervals in the air, between one of the conductors of the induction apparatus and one of the platinum wires which pass into the tube. A simple discharge from an electric battery of several jars produces the same effect. In order to observe the persistent luminosity, it is necessary to work in the dark, and to keep the eyes closed during the discharge, in order that the retina be not affected at the instant of the passage. It is necessary that the portion of the tube in which the discharge takes place should be at least six or eight inches long. The particular effect which illuminates the tube occurs with the particles of hydrogen themselves, and does not extend to the surface of the tube. For, in using vessels of the capacity of about fifteen cubic inches, the entire body of gas becomes opalescent. In lengthening the tubes beyond the platinum wires, it is also found that the rarefied oxygen outside the part which immediately receives the discharge also emits light. On the other hand, this opalescence of the gas shows, that the effect does not result from electric discharges caused by the electrisation of the glass, and which would pass through the illuminated portion after the cessation of the inductive discharge, which effect may also be produced by rubbing the exterior of the tube. When a tube is under the action of a luminous persistence, at the moment when the electricity is passing, a yellow tint appears, illuminating the body of gas in the tube, and that independently of the various tints exhibited by the electric sparks produced by the mixture of gases. When this yellow tint disappears, the effect of persistence ceases to be observed. It is even possible that some gases, mingled with oxygen, increase the duration of the persistence; for tubes prepared under apparently similar conditions have exhibited different effects of intensity and duration. If the experiment is made with a tube containing a small quantity of rarefied oxygen, a certain time after the passage of electricity, the effect of persistence ceases to be appreciable. This result would seem to show, that the particular property now under consideration disappears at the end of a certain time in the gas. Whether it be connected with the formation of azone, which, under ascertained conditions, cannot go beyond a certain limit, is what I have not as yet been able to discover. Sulphurous acid gas has sometimes presented an appearance similar to that of the oxygen; but, the effect not being always produced, I have thought that it was caused, perhaps, by a partial decomposition of the gas, and a mixture of oxygen, in the same manner as rarefied air in presence of phosphorus. I am, however, still pursuing these researches, and hope to be able to ascertain whether, by the aid of a similar method as that used by me in the phosphoroscope, other gases and vapours, besides oxygen, may not produce effects of luminous persistence, of shorter duration than that observed with the latter. The phenomenon exhibited by the oxygen, and, perhaps, in different degrees by other gases, depends probably upon a particular action produced by electricity; for the solar light, and the electric light itself, do not exhibit any phosphorescence of this kind. Whether or not this is the result of the vibrations produced in the particles of gas, or of a particular state of infinitesimal electrical tension, continuing for some instants, or from some other physical or chemical cause, is what I have still to discover."—*Cosmos.*

SCENERY OF THE MOON.—By means of the telescope, mountain peaks are distinguished in the ash-grey light of the larger spots, and isolated brightly shining points of the moon, even when the disc is already more than half illuminated. Lambert and Schroter have shown, that the extremely variable intensity of the ash-grey light of the moon depends upon the greater or less degree of reflection of the sunlight which falls upon the earth, according as it is reflected from continuous continential masses, full of sandy deserts, grassy steppes, tropical forests, and barren rocky ground, or from large ocean surfaces. Lambert made the remarkable observation (14th of February, 1774) of a change of the ash-coloured moonlight into an olive-green colour, bordering upon yellow. "The moon, which then stood vertically over the Atlantic ocean, received upon its right side the green terrestrial light which is reflected towards her, when the sky is clear, by the forest districts of South America." Plutarch says, distinctly, in his remarkable work "On the Face in the Moon," that we may suppose the *spots* to be partly deep chasms and valleys, partly mountain peaks, which cast long shadows, like Mount Athos, whose shadow reaches Lemnos. The spots cover about two-fifths of the whole disc. In a clear atmosphere, and under favourable circumstances in the position of the moon, some of the spots are visible to the naked eye, as the edge of the Apennines, the dark, elevated plain, Grimaldus, the enclosed Mare Crisium and Tycho, crowded round with numerous mountain ridges and craters. Professor Orgelander remarks, that a map of the eastern hemisphere, taken with the Bay of Bengal in the centre, would bear a striking resemblance to the face of the moon presented to us. The dark portions of the moon he considers to be continential elevations, as shown by measuring the average height of mountains above the dark and the light

portions of the moon. The surface of the moon can be as distinctly seen by a good telescope, magnifying 1,000 times, as it would be if not more than 250 miles distant.—*Curiosities of Science, November*, 1858.

Photographic Notes and Queries.

PORTABLE DARK TENT.

SIR,—Allow me, through the medium of your excellent paper, to describe a photographic tent, which I can confidently recommend (from experience, having tried several), as being the *most convenient* that has been hitherto invented—

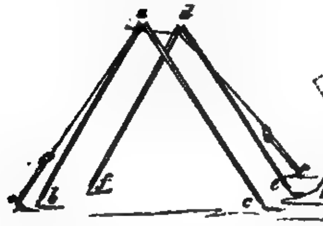


Fig. 1.

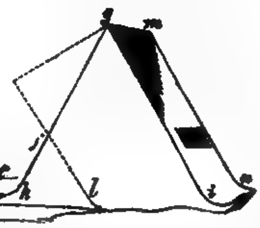


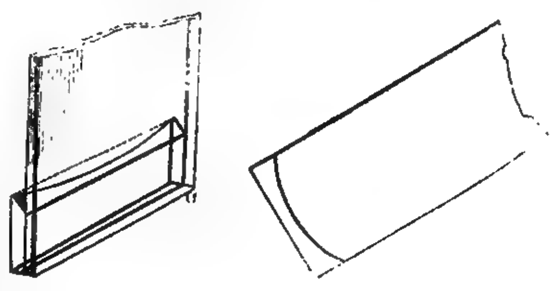
Fig. 2.

ab, *ac*, *de*, and *df*, Fig. 1, are four poles, 5 feet long, of ¾-inch seasoned pine, hinged at *a* and *d*, and having steel spikes at *c*, *e*, *b*, and *f*. Through holes at *a* and *d* is passed a strong cord, which has two knots, at 34 inches apart, *within* the points *a* and *d*, thus keeping the whole taut and firm when the ends are secured by means of tent pegs, as shown in the figure. The covering consists of equal lengths of the thickest black twill lining and yellow glazed calico, of a yard wide, four yards of which are tacked on to form the two sides, leaving, of course, nearly 12 inches over at the bottom, to rest on the ground, for the better exclusion of white light. To cover one end, two yards are to be tacked from *g* to *i*, Fig. 2, leaving a similar overplus at *i*; this piece is also tacked along *g j*, the overplus, *g r j*, being cut off, reversed, and stitched on to *j l*, and tacked at *j h*, which completes one end. The other is covered in a similar manner, except that it is double, and each piece is tacked only on *one* side, thus lapping over each other and forming the entrance. The window is in the side, and may be of three or four thicknesses of yellow calico, size 18 inches by 12. When erect, the tent covers fifteen square feet of ground, which is ample space for the manipulation of any reasonable sized plate. It can be "pitched" or taken down in the space of two minutes, and is proof against wind, or even a shower of rain. To pack it, the ends are folded in first, closing the hinges; then, by doubling it up, the four poles are brought into contact, on which the whole may be rolled, the cord serving to secure it, or it may be slipped into a tubular case of oil cloth to preserve it from injury. The tent takes ten yards of each material, and the whole costs about twelve or thirteen shillings. R. P. H. N.

PROTECTION OF GLASS BATHS.—IMPROVED DIPPER.

SIR,—One of your correspondents, in a recent number of the "NEWS," mentions an accident, which resulted in the destruction of a valuable glass bath. Mishaps of this kind, arising from the glass plate slipping from the holder and cracking the bottom of the bath are, as I have found to my own cost, by no means uncommon. But the remedy is simple; and consists, either in covering the bottom of the bath with a strip of *pure* gutta percha, about a quarter of an inch thick; or, with a stratum of finely broken glass, over which is fitted a piece of plate glass to prevent the disturbance of any sediment by the dipper when the bath is in use; or, similar security might perhaps be obtained by dissolving *clean picked* shel-lac in alcohol, to the consistence of varnish, and distributing it equally over the bottom of the bath to the depth of a quarter of an inch. By employing *broken glass*, all chance of contamination from organic matter is removed, and this is the method I prefer.

Your notice of Mr. Lake Price's silver wire dipper is valuable, as this dipper affords ample protection against the *slipping of the plate*; but I fancy that wire of the absolutely required *purity* is very difficult to be obtained; and it sometimes happens, that both *plate* and *holder*, in the experiments of "bunglers" (and old hands often bungle in hurried manipulation), make far too precipitate a retreat to the bottom of the argentine solution to be unattended with danger to the bath. In all cases, therefore, I should advise the adoption of one of the precautions I have suggested.



These figures represent the bottom of my dipper.

The glass dippers which I employ, are made as follows:—The strip of glass, forming the bottom of the holder, is cemented thereto with marine-glue in the usual manner; but, before attaching it, I grind off the *inner top edge*, or the side which is attached to the holder, on the *flat* side of a common grinding stone; and, having done this, I place the ground edge vertically on the convex side of the stone, and hollow out the top to within $\frac{3}{16}$ths of an inch of the whole length on each side. The glass plate, however unevenly cut, will thus rest against the face of the dipper on two *projecting points* at the bottom, and obviously acquire additional security. W. L.

PREPARATION OF SACCHARO-SULPHATE OF IRON.

SIR,—In reply to your letter, I send you the following extract from the Pharmaceutical Journal, for December 1st, 1857:—

Protosulphate of Iron with Sugar.—"It is extremely difficult to prevent the oxidation of sulphate of iron; nevertheless, in chemical research, and for use in pharmacy, it is important to have a pure protosulphate of iron. According to M. E. Latour, the addition of sugar preserves the salt from alteration. M. Latour has shown, moreover, from careful analysis, that the salt crystallises with sugar in a regular manner, and of a definite composition. It is prepared in the following manner:—

"200 parts of pure protosulphate of iron are dissolved in 100 parts of boiling distilled water; 50 parts of crystallised sugar (sugar candy) are also dissolved in 30 parts of boiling distilled water. On mixing the liquors, and rapidly filtering, crystals are deposited between 95° and 100° Fahrenheit. These crystals, collected and dried between folds of blotting paper, should be preserved in a dry bottle. By concentration, a fresh quantity of this salt may be obtained. The crystals are oblique, rhombic prisms, having the composition—

Protosulphate of iron	54·57
Water	32·5
Sugar	12·93
	100·00"

I procured some simply for medicinal purposes; but, upon seeing it, it immediately occurred to me, that it would be an admirable photographic agent, and so it has proved in my hands. It is optional to increase or diminish the quantity of the salt to each fluid ounce of the developer,

viz., in any of the ordinary negative and positive formulæ; but, I think, as the saccharo-sulphate produces a very uniform and dense reduction on the plate, a smaller quantity is required than when the common sulphate is used, and this remark applies more especially to positives. I have been trying the effects of replacing the organic acid in the developer by a mineral one, but at present cannot say much as to the result. Nevertheless, I believe sulphuric acid, in proper quantities, may be substituted for acetic acid. *Nous verrons.* HUGH ROBERT RUMP.

COMPARATIVE EXPERIMENTS ON DRY PROCESSES.

SIR,—Your correspondent "W. L.," in his reply to my remarks on dry processes, commences with a good idea, namely, a faithful report of a committee of practical and unprejudiced photographers on the comparative merits of the various dry processes. I myself have no objection to become a member of such committee. It is not my intention here to reply fully to your correspondent; I am about to write a paper, giving full particulars of the experiments I have been engaged in with the three processes in question, illustrated by prints from negatives taken at the same time and of the same subjects by Dr. Hill Norris, Taupenöt, and Fothergill. Just allow me, however, to inform "W. L." that he is quite mistaken, when he assumes that I used the *same collodion*, and did not excite Fothergill's plates in the acidulated bath. That would be one way, certainly, of making comparative experiments, but not the one adopted by myself. If your correspondent had paid attention to the first portion of my letter to you, he would have discovered that I must have been particular, inasmuch as I had plates prepared by an eminent firm in London sent down, prepared by them after Fothergill's and Dr. Hill Norris's plans in plates extremely well prepared, especially judging from the results of the latter.

Allow me to make one or two remarks in reply to "Photos" respecting his failures in Taupenöt's process. He does not accurately describe the cracks. I would ask, did he fix with *hypo.* or *cyanide?* If with the former, possibly he had it prepared *too strong*. If this had nothing to do with the cause, did he omit the sugar solution in the albumen, and afterwards bake his plates in too hot a place? a *warm* oven is better than a *hot* one for the purpose. As to blisters in the process, if your correspondent will only adhere strictly to the following simple instructions he will not encounter blisters. *Slightly warm* the plate before coating with collodion; allow *it to set well;* always work in a dry and warm room, kitchen, if you like; before beating up the albumen, put a bit of lump sugar, *an ordinary lump*, into it: and if he has blisters after attending to this, it will puzzle me to know the cause. I never meet with such a thing in my operations. The collodio-albumen process takes a little more time than most others, but the results are worth the trouble; a more sure and certain process there is not, not even excepting the wet process itself. Fothergill's process, as I stated before, is a very good one, but not so certain as Taupenöt's, and I contend, not so quick. I never expose longer with sunshine than from 45 to 60 seconds with 4 in. focus, $\frac{1}{16}$ stop; and I don't think "W. L." can work quicker than this. As to trouble and time in preparing, I can with ease prepare one doz. stereo. plates in one hour. JOHN DRAFFIN.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

SIR,—Your correspondent "H. I. (M.R.C.S.)," who complains of the disappearance of his pictures on the application of the varnish, will find a simple (and, as I believe, the only) cure for the annoyance, in the addition of a little soluble cotton to the collodion employed.

Some years ago I had much trouble from this cause, and tried many varnishes; and I found that pictures taken upon the thin collodions sometimes used, are always readily dissolved by *spirit* varnishes, and that for such pictures some other protection must be used, as the turpentine or chloroform varnishes. I never now use strange collodion without trying on a spoiled or otherwise valueless picture its varnish-bearing properties.

It will sometimes be found that a streak or cut is formed at the edge of the pool of varnish first poured on; this indicates that the film is but just strong enough to bear the solvent action of the varnish, and it is advisable in this case to heat the plate as little as possible before varnishing, and to keep it slightly in motion during the process, to prevent the formation of a stationary line of varnish.

C. P. W.

THE STEREOSCOPE.

SIR,—May I be permitted to say a few words regarding Mr. J. W. Fall's plan of looking at stereograms through a single aperture (vol. ii. p. 71).

1st. The stereograms must be mounted "with the pictures reversed," *i.e.*, the right hand picture on the left side; and a slide so mounted will be pseudoscopic when viewed in a stereoscope.

2nd. The eyes being crossed to a distance of five or six inches is, to say the least, disagreeable.

3rd. The image is virtually formed in the aperture, where the rays cross, and therefore appears very small; and if the slide be mounted in the usual way, will be pseudoscopic.

On the other hand, if a slide be viewed through two apertures, each eye looks at its proper picture, and the eyes being focussed (so to speak) for the distance of the slide, the image appears to be of its natural size.

By "image" I mean the effect produced on the mind by the blending of the two pictures.

The chief use of the box which I proposed is to keep all light from the eyes, which is not required to see the slide; and the diaphragm prevents the external false images from being seen, but a slide can, after a little practice, be seen stereoscopically without any apparatus, as I proposed in my first letter.

Can any of your readers explain the fact, that if a slide be inverted in a stereoscope the effect is still stereoscopic, not pseudoscopic, although each eye is looking at its wrong picture? X. P. R.

DEVELOPING SINK.

SIR,—Always thankful for the many kind and valuable hints so often thrown out by you in your journal, I take the liberty of asking if any of your readers can furnish me with a good plan for a developing and washing sink, at the same time saving the silver, which becomes rather a serious consideration after a time, when negatives are made. I have lately made a new dark room, similar to that recommended by Lake Price, but I wish to make one answer the purpose of the two mentioned in that gentleman's book. If any of your correspondents can kindly suggest anything to forward me in this, I shall be greatly obliged. C. W.

THE FOTHERGILL PROCESS.

SIR,—I was glad to see the remarks by "W. L." upon the wholesale condemnation of the beautiful "Fothergill process" contained in your former number by Mr. Draffin. Allow me to add my testimony, to that of "W. L." and other of your correspondents, as to the successful results to be obtained from it, if proper care be taken in the manipulation. I have found much more uniform results from this than from any other dry process which I have tried, and certainly in keeping qualities it is far superior. I enclose you a print from a plate which was exposed early in the present month, having been prepared in October last, nearly six months. The exposure was 13 minutes, before 8 o'clock, a.m., $\frac{1}{4}$th stop, focus 18 inches.

Being very doubtful as to its success, I was not sufficiently careful in development, hence the stains you see in the

corner; but for amount of half-tones and beauty of detail, I do not think it could be surpassed by any other process. The print is toned with Mr. Hardwich's alkaline gold bath, which I have found very satisfactory. J. C.

[Considering the length of time the plate was kept sensitive, the specimen print forwarded by our correspondent is one of the best we have ever seen.—ED.]

CLEANING DAGUERREOTYPES.

SIR,—For the information of your correspondent "Zingib," vol. ii., p. 71, as to the best method of cleaning daguerreotypes from dust, I send the following directions:—Let him take the plate out of its case and blow the dust off, by means of an elastic bottle; if some still remain on, wash the picture in distilled water, and dry it as follows:—Take hold of the silver plate by one of its corners with a pair of pliers, cover the plate with distilled water, and apply a lighted spirit lamp to the under surface, gradually warming it, and then slanting the plate a little so that the water may run off by one of the corners, follow the receding water with the lamp, and at the same time blow the water steadily with the mouth; in an instant or two the plate will be dry and bright; be careful in drying not to heat it too much, or the silver will exfoliate. In case of an oxide being formed on the surface of the plate, dip it in a weak solution of cyanide of potassium until it is cleared, wash carefully, and finish as above. J. I. MAGINN.

SUBSTITUTE FOR A GLASS ROOM.

SIR,—Your correspondent Mr. Doubleday has been kind enough to suggest the substitution of a calico waxed tent for a glass house, but it occurs to me that the wax would *melt* under a hot sun, and in a short time the tent would be anything but waterproof. But, as experience is always better than theory, will Mr. Doubleday kindly state whether my supposition is likely to be correct? I am anxious to ascertain this before incurring the expense of constructing a tent that may not answer the purpose. Possibly some of your readers may be able to suggest a better preparation than wax? I have thought of resin and turpentine, but the colour, I suppose, would be objectionable? A good cheap tent of this description for amateur photographers is a great desideratum in the neighbourhood of London. BETA.

ANSWERS TO MINOR QUERIES.

CEMENT FOR GLASS.—*A Correspondent, F. O. Y.*, has favoured us with the following cement, which he has found to be excellent for joining broken glass baths. Mix together in a mortar two parts of albumen and one of white cheese, and add lime until it is of a proper consistency; then apply it to the surfaces to be joined, and press in contact. When the cement is dry, fill the vessel with vinegar, which will coagulate the albumen, and render the cementing perfect.

DARK STAINS ON POSITIVE PRINTS.—*Lorimer.* The cause of the stains like grease which appear on your positive prints when mounted, is the soaking through of the gum arabic. The washing to which the prints have previously been subjected has soaked away the size in places, and when the back of the print is coated with gum arabic it soaks through in these places, and appears as a dark, greasy-looking stain on the face. As a remedy, mount your prints with good starch paste.

LEVELLING A CAMERA.—*Tourist.* The best plan will be to take a small circular spirit level with you. In default of this, you will find a suggestion, which was made by Mr. Wilkinson in the pages of a contemporary some years ago, extremely useful. He suggested fastening a leaden bullet to each end of a silken thread, about a yard long, and then having drawn a perpendicular line on each side of the camera, exactly opposite to each other, place the thread over so that each end hangs down along these lines. If the thread does not touch the lines all the way down each side, one or other leg must be adjusted until the thread lies close to it along its whole length, and the camera will be perfectly level. Mr. W. further suggests that if knots be made in the silk cord one foot apart, it would do occasionally for measuring purposes.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. S.—Any eminent professional photographer would, we should think, undertake to give you a fair opinion on your lens for a fair remuneration.

F. L. O. S.—We think so.

P. S.—Your developer is correct. The fault is either in the collodion not being adapted to taking positives, or in the bath being too acid. Partially neutralise the bath first; and if that does not remedy the evil, change the collodion. If our correspondent takes no more notice of the information contained in the body of the "NEWS" than he does of the proper initials of the Editor, we are not surprised at his want of success.

C. KEMP.—1. You should have carefully studied our first volume, and you would have found many of your difficulties explained and removed. 2. It would be impossible for us to give any idea of the value of the second-hand apparatus you describe. 3. Purchase your chemicals ready-prepared for the present. 4. English lenses are considered the best. 5. See vol. ii. p. 2.

C. WILLIAMS.—We frequently use pyrogallic acid after it has become quite brown, but cannot advise its employment for very delicate work.

TYRO.—It has been *discovered* three separate times to our certain knowledge.

T. CLARK.—Cannot our correspondent communicate to us the particular information in writing which he so kindly offers to give us. Our time is so fully occupied, that we cannot at present appoint a time for an interview.

J. M.—If our correspondent will tell us the particular points in the daguerreotype process upon which he desires information, we will endeavour to assist him; but to answer such a very general request as he has now forwarded, would require us to write a book on the subject.

CAPTAIN A. N. S., India.—We are much obliged for our correspondent's beautiful views of India; and have posted to him, in return, eight stereograms of English scenery. Not, however, all from our own negatives, as we, unfortunately, have no duplicates, but a selection.

J. J. JONES.—We can only advise you to advertise in our columns; and we have no doubt you will meet with an answer such as you wish for.

W. G. JACKSON.—A good lens, bright light, and chemicals in perfect order, are all that are necessary for taking instantaneous pictures.

T. N. S.—1. Your former letter was answered by post within a day or two of its being received. 2. You are quite correct in acidulating your bath with acetic acid, in spite of what your friend says. Only just sufficient should be put in to give it an acid reaction; and either dilute or glacial may be used, if pure, in quantities proportionate to their strength. Many thanks for your stereogram.

T. N.—J. C.—Received.

A. G.—An agate burnisher can be procured at an artist's colour manufacturer. Consult our advertising columns.

ARTISAN AMATEUR.—1. The process is not a very good one; we gave a better formula at vol. i. p. 108. You should use *French* photographic paper, not *English*, for this purpose. The cause of the white spots is, insufficient silver in the exciting bath. 2. No; the waxed paper process is best suited for foreign paper. 3. The stop should be as far from the lens as can be, so as not to give dark corners in the picture.

PERSIGNEY.—1. Use a twin-lens camera. 2. Measure the distance of the lenses apart from *centre* to *centre*.

R. W. F.—1. Your picture is quite up to the mark of an amateur's *first* production; but by no means as good as you will soon get if you persevere. 2. It would be improved by being slightly deeper printed. 3. Not sufficiently toned. 4. See the positive printing process of our correspondent S, in a recent number. Your print is not sufficiently washed; we can almost see it fading before our eyes.

J. LUCK.—No practical and certain process has yet been brought out, whereby a collodion plate can be kept with its sensitiveness unimpaired for two or three hours, and at the end of that time give results equal to an ordinary wet plate. Try some good dry process.

A HITCH SOMEWHERE.—You had better write to the firm and ask for an explanation; we cannot interfere.

A PHOTOGRAPHIC TYRO.—1 and 2. From your account of the effect, we should think that the silver bath was not strong enough. Strengthen it, and add a little more gold to the toning bath. 3. New eggs give the most brilliant whites; stale albumen has a tendency to turn the whites of the paper yellow.

NOVICE MUX.—Transparencies for the magic lantern are printed from negatives on a dry plate, and developed in the ordinary manner. They then appear as positives when looked through.

EXCELSIOR.—1. See letter in this number. 2. Only well washed. 3. The silver bath should be about three times as strong as the salting bath in the positive printing process.

B. GORRI.—Try the alabastrine process, as given in our first volume.

A. B. B.—No plan will give, *direct*, a collodion positive equal in brilliancy to the one which you have enclosed, and which has been polished with wash leather.

Communications declined with thanks:—F. A. R.—A Mechanic.—Tonkins (We have already published the same plan).—Isa. B.—Casper.—Stereo.—Emily B.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Letter B.—Querist.—A. Z.—Hypo.—A Perplexed Novice.—London.—M. C. H.—Jago.—"Tre Pol and Pen."—A Photographer.—Uncle Tom.—F. Coaching.—Electricity.—C. B. O.—G. T. U. A. B. C.—Lime.

IN TYPE:—T. F.—M. P. M.—Alfred Keene.—W. A. Young.—E. S.—J. B.—H. S. I.—A Kerry Man.—Viator.—Evargrah.—Camera.—G. W. C.—O. A. Aliquis.—T. Millard.—N. T. A.—W. W. Hughes.

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*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 36.—*May* 13, 1859.

COMPARATIVE EXPERIMENTS ON SOME OF THE DRY PROCESSES.

BY MR. JOHN DRAFFIN.*

I think it is now generally admitted that on journeys for photograph practice, a good dry process is far superior to the great inconvenience of taking out all the apparatus requisite to work the wet collodion process, especially in hot or windy weather.

Now, having for the last twelve months been exclusively engaged in outside practice, as well as cathedral, &c., interiors, I, of course, have endeavoured to ascertain, with some degree of certainty, which of the various processes recommended, would suit me the best. Accordingly I made a series of experiments with the following:—M. Taupenot's, Dr. Hill Norris's, Mr. Fothergill's, the Honey and Raspberry Syrup processes. The result was that I rejected the two latter, and determined to continue my practice with the three first named, which I did for a considerable time, taking three negatives of each subject—one by each of the three methods.

It is not my intention to argue that this, that, or the other process is best, but simply to lay before you as accurately as I can, the results given, the method adopted by myself in preparing the plates, the length of exposure in each case, and the degree of light and nature of subject taken; and I purpose illustrating this to you by means of specimen prints. It will, then, be for you to judge which you think the best process to adopt for general purposes. I say, all three are exceedingly good, and especially are they so for out-door practice; in fact, for this purpose there is very little to choose between them when proper care is taken in manipulation. But, as I proceed, you will perceive that it is not only for outside photography that a process should be good to make it all that is wanted. I find to a certainty that in places where there is a deficiency of light—as for instance, a thick wood, or the interior of a church or cathedral—that M. Taupenot's process must take precedence of all others. This I can prove, I think, to your satisfaction, when I state that a short time ago, a fine old chest was taken out of the wall of the vestry of York Cathedral, where it had been hid for a long time. This chest being a magnificent thing of its kind, I determined to obtain, if possible, a photograph of it, and obtained permission to do so. Accordingly I set to work with three plates—Taupenot's, Fothergill's, and Norris's. Now, the chest being immovable, is fixed in a niche in the wall of a dark dismal room, the vestry, and is itself quite black. I exposed each of these plates five hours. The result was that Fothergill's was a failure, completely so—Norris's considerably better—and Taupenot's, the specimen before you, which I think you will admit is a good picture, considering the circumstances.

Now, on the other hand, outside, I exposed, on the same day, one each of Taupenot's and Fothergill's, from the same series of plates, prepared at the same time. The "Ruins of St. Mary's Abbey, from the City Walls" is the one in question. It was taken at twice; one half of the picture is by Fothergill's, the other Taupenot's; the latter you will perceive is more exposed, to all appearances, than the former. The time given was: Fothergill's, 1 minute; Taupenot's, 35 seconds; full sunshine, 4 inch focus, ¼ inch stop, as a proof that the exposure was quick. You will perceive in Taupenot's that several men who were at work in the grounds are actually taken in the act of filling a barrow, although they had no notion that I was photographing—in fact, I was at least one-eighth of a mile distant. I will now call your attention to three other pictures of ordinary light and shade, viz., grass, trees, masonry, &c. These views were taken immediately after each other—the exposure as follows: Taupenot's, 45 seconds; Dr. Hill Norris's, 1 minute; Fothergill's, 1½ minutes; and also to another picture taken from a great distance, so as to enable me to obtain the various objects of interest a moderate size for a picture, I used a 14 inch focus, powerful lens, with an ½ inch stop. I gave both pictures (right and left) the same exposure, 2 minutes: one is Fothergill's, the other Taupenot's; the plates used were the ordinary 6¾ × 3¾, but the prints were cut down to make a stereogram. Now, you will see here that there is a very marked difference between the two pictures. The next I would call your attention to is a picture taken by Dr. Hill Norris's and Taupenöt's, the exposure being exactly the same—1 minute, rather weak sunshine. Very little difference here, but Taupenot has it. Next, to two interior views of York Minster—one by Fothergill's, the other Taupenot's. Fothergill was exposed 4 hours, Taupenot ¾ of an hour, both the same subject—the Nave—only one looks east the other west; the light all came from the south, so that both had the same light. Here you will see there is no comparison. The beautiful view of the South Aisle in York Minster is, perhaps, the best one of the kind I have produced. It is a Taupenot plate; and you will observe, although exposed a full hour, the beautiful window is perfectly given, and has not suffered from over exposure. In this respect I find Taupenot's process far superior to any other, and it is here chiefly where I am at issue with those who condemn this process, because if their practice has been confined to country, &c., views, they are not capable of judging the great merits of the process. Comparatively speaking, I am aware that very few interior pictures are done, because of the great and manifold difficulties to encounter. Still, if we want to adopt *the best dry* process, it must be that one which is equally good for interior as well as exterior, and not the one good for exteriors only.

Now, from the remarks which have been made here respecting three processes, it will be inferred (and correctly) that I am in favour of the collodio-albumen process. I have no doubt some parties will say, you have not prepared your Fothergill's plates right; you must have let *one or two drops of the four drachm washings fall off one corner* of the plate, or you have washed too much. In answer I beg to say, I think I can manage the *four drachm washing* as expertly as most people; that I can also wash with a 10-grain silver solution; that Keen's collodion is to be had by me as well as by other people; that I know how to make a neutral bath of silver. I not only think that I can do all this, but have followed in my experiments all out to the letter. And I think I dare challenge the best practitioner in Fothergill's process to produce for me a good negative, taken in 25 to 30 seconds, 4-inch focus, $\frac{1}{16}$ stop, as I saw stated had been done some time since. I have put myself to a considerable amount of trouble and expense in ascertaining the above facts; because, knowing the amount of work I had before me, I was determined to find out and adopt that system best calculated to enable me to get together what I

* Read before the Charlton Photographic Association, May 11th, 1859.

have—some hundreds of negatives of interest to all tourists in Yorkshire, &c.

For the benefit of those who may feel disposed to try their hands at a dry process, and for the satisfaction of others, I will proceed to state the mode I have adopted in preparing the plates by the various processes in question:—

COLLODIO-ALBUMEN.

Collodion.—Any collodion will do, provided it is not rotten. Old collodion is the best—and, as a rule, I prefer it thin.

Albumen.—To the whites of 6 fresh eggs, or 6 oz., add—

Water	1½ ounces.
Liquor ammonia	1 drachm.
Iodide potassium	½ „
Bromide	6 grains.

A bit of lump sugar, say 2 drachms weight.

Beat all up for 20 minutes, or until it will froth up no more—this is best done with a bunch of a dozen quills, a table-fork must not be used. Let stand all night, and filter through sponge into a bottle—put a bit of camphor to it, and a little collodion round the cork and it will keep any time.

DEVELOPER.

Saturated solution of gallic acid. This developer is best for beginners.	or,	Pyrogallic	2 grains.
		Water	1 ounce.
		Glacial acetic	20 drops.

Add to each ounce 4 or 5 minims of a 20-grain solution of nitrate of silver.

Fix with hyposulphate of soda.

For the bath take—

Distilled water	1 ounce.
Nitrate of silver	40 grains.
Glacial acetic acid	30 minims.

Before commencing to prepare the plates, rinse out a glass measure with a lip to it—don't wipe it with a cloth at all—pour off two or three ounces of albumen into it, and have another vessel ready to pour the albumen off the plate into—as it should not be poured back into the same vessel, or it will create bubbles, which the operator will find awkward to get off the plate. Line the kitchen oven with paper, and on the bottom put a clean cloth for the plates to stand on, and proceed as follows:—Before coating with collodion, WARM THE PLATE SLIGHTLY (let those who practice this method, and who are mortified by seeing their good negatives ruined by blistering, take particular notice of this), and coat with collodion, allowing *it to set well*, say half a minute; then sensitise in either the ordinary bath or in the aceto-nitrate. I use the latter, making one bath do for both purposes—sensitising the collodion and albumen film. I take care to keep the bath clear by means of kaolin—or what will suit as well, I find, *Fuller's earth*—and perhaps this is a fact worth knowing, as the former article is sometimes difficult to obtain. Take the plate out of the bath and wash for half a minute under a strong stream of water from a tap. This plan of washing I find far superior to the old plan of washing in bowls. By the latter plan the negatives generally were filled with innumerable specks or holes in the high lights and skies; by the former mode this is entirely obviated. Allow the plate to drain on blotting paper or a clean rag of any sort while you proceed with another plate, and by the time this is put into the bath, the former plate will be ready for coating with albumen, as follows:—Pour on, say a quarter of an ounce, and let it run all round the plate, pour off into a separate glass, repeat this with a fresh dose, and put the plate in the oven to dry. Mind no dust comes near it now. The albumen may, after all is done, be put back in the bottle again with a little camphor, and may be used over again two or three times. By systematic working eighteen plates may be prepared in one hour, which I should think quick enough for anything, besides the advantage that these plates, after coming out of the oven, will remain good for any length of time, provided they are kept dry. I have no doubt they will keep for years. The only thing to be done next is, when the plates are cold, to dip them into the bath again for one minute, and wash under a strong stream from a tap one minute. Well washing here must not be neglected or stains will follow. They may either be dried as before, or spontaneously; I prefer the former. The advantage of these plates to parties going long journeys must be admitted by every one. They may take out a quantity not sensitised, and should they become exposed to the light it is no matter, and the atmosphere has no effect (except moisture). By taking out sufficient silver and acetic acid, they can sensitise their plates the night before they are wanted without any trouble, and are then sure of good plates; but suppose a party (and I have known more than one instance), going abroad for two or three months, and taking a quantity of sensitised plates with him, how many negatives is he *sure* of bringing back with him out of every dozen plates, I should like to know? Or suppose some jealous Custom House officer insists on smashing his plate box open? (That has been done, too). Now, if the plates contained in the box were plain collodio-albumen ones, this would not matter, even if opened in strong sunlight; and, as a proof of this, I show you a plate which has been prepared upwards of two months, exposed to strong sunlight before the second immersion in the bath, has been sensitised six weeks, and it is three weeks since I exposed it in the camera; the length of time given was, with 4-inch focus, ½-inch stop, sunshine, fifty seconds. Perhaps my friend Hooper will develop it for you.

In developing, care must be taken, and for parties who wish to begin the process, I should recommend them to use the gallic acid as a developer, adding three or four drops of 20 grain solution of silver. I use the pyrogallic generally, because it saves time; with that I can develop my picture in ten minutes. I would also warn beginners not to *over-develop* their negatives; I have seen many a good picture developed to such an extent as to be useless for printing purposes. There is a difficulty, especially to beginners, in judging by candle-light the exact time to stop the action of the developer. Now this plan will be found a good one. Develop till the detail in the shadows is well out, and then fix with hypo.; next day, by daylight, the negative may be brought up to the proper amount of density, and if the exposure has been right a good picture no doubt will be the result. With respect to the exposure in the camera, this so much depends on the quality of lens, the light and nature of the object, that I shall leave beginners to find this out for themselves. I have frequently heard it stated that thin skies are the result of over-exposure. This is quite a mistake. A great deal has been said about the trouble connected with this process. Now, sir, I find *it the easiest* process to work. There is not that exact amount of care required in washing—you cannot over wash the plates; if you want to prepare a quantity of plates in a hurry, you have not to run for this or that collodion—any will do; and if you have not used your bath for months, and don't know its condition, it does not matter. The great thing to be observed to ensure success is plenty of washing after the last sensitising, attention to the amount of exposure, and care in the developing. Should stains appear on the surface, they can easily be removed by means of a little cotton wool.

FOTHERGILL'S PROCESS.

I have adopted the following method in treating these plates. With Keen's collodion, a neutral bath is usually recommended. In washing I have found it the safest way to dip the plate into a solution of nitrate of silver, say 5 to 6 grains to the ounce. The four drachm washing gives, perhaps, rather quicker results, but not much so; and unless the greatest amount of care is taken, peculiar markings in the negative are sure to take place. If the four drachm method be adopted, it is certainly advisable not to use the same water twice over, but to pour on an equal quantity of distilled water on each plate fresh. The simplest and best method of preparing these plates, I think, was given in one of the journals some time since by an Edinburgh gentleman. I believe his name was Bell. His formula I tried, and found

it to answer well; as also that recommended by him for making a collodion for this process, which I found to answer quite as well as Keen's. Perhaps, should this catch his eye, he will favour the public once more with his paper—to those who practice this process it would no doubt be of service. The plates, after albumenising, I allowed to dry spontaneously, and afterwards placed them in a hot oven. The developer used was the ordinary pyrogallic.

DR. HILL NORRIS'S.

I will glance over the method adopted by me in this process; if I am not taking up too much of your time. Any good negative collodion will do, but it should not be *new*, or sufficient amount of density will not be obtained. After sensitising in the usual way, I wash well the plates, and *immerse* in the gelatine, prepared exactly according to Dr. Hill Norris's formula, allowing the plate to remain in this a few minutes. It is then taken out and dried in a warm oven. The only difficulty I have met with in this process is that the film is liable to become detached. This, I have no doubt, depends much on the kind of collodion used; a tough one being the best, as it adheres more firmly to the glass. Great care must be observed in the development, as should stains take place the film will not bear touching. The developer used for this process is the ordinary pyrogallic. Fix with either hypo. or cyanide.

In conclusion, I beg to call your attention to a print which has been treated as follows:—The ordinary albumenised paper floated on the *back* on the solution of gutta percha, recommended some time since—the print was washed *five minutes only*, and has been printed nine months, constantly exposed to light. I merely wish to call your attention to the whites in the picture (not many certainly), but considering the amount of washing and the careless way in which it was done, I think it says a good deal for the gutta percha plan.

MONKHOVEN'S CELLULOSE PROCESS.

THE following communication has been addressed to the editor of *La Lumière* by M. Van Monkhoven, dated Ghent, April 25:—

"I am truly sorry not to have been able to send you sooner the communication I promised you; but the fact is, the weather has been so bad here, that I could not make up my mind to make a single attempt to take a picture out of doors, which I could send you as a specimen of what my process is capable of doing. I therefore send you merely those I have by me. I may add, that they are quite good enough to convince amateurs of the value of the method I offer them.

"Thus, instead of collodion, I simply substitute an iodised solution of cellulose in oxide of cuprammonium. Let not the reader be alarmed by this long word—nothing is more easy than to prepare it.

"I begin, by preparing the oxide of copper, in the following manner:—In about ten quarts of luke-warm water, contained in a wooden or glass vessel, I dissolve three parts of commercial sulphate of copper. I also dissolve two parts of caustic potash in its weight of water; and when the two solutions are completed, I mix them. The liquid, when mixed, is of a greenish blue tint, but by agitating it strongly by means of a glass or wooden rod, and leaving it to itself for a few hours, the supernatant liquid will be found clear. This must be decanted with a siphon, and fresh water poured in, in order to free it from foreign salts (sulphate of potash, and potash in excess). The liquid must be allowed to stand for some hours, and decanted in the same way as before. Finally, this operation must be repeated three times to get the oxide of copper very pure; then the liquid must be emptied upon a linen filter to drain. The excess of water filters through, and, at the end of twenty-four hours, the mass acquires a pulpy consistency. This substance may then be removed from the linen with a wooden spoon or a piece of glass, and put into a wide-mouthed, glass-stoppered bottle, and an addition made to it of about nine parts of liquid ammonia of commerce. I ought to mention, that the ammonia should be as free from colour as possible. All the oxide of copper is dissolved by shaking the vessel, and a liquid is obtained of a splendid deep blue colour. This is left to settle for twenty-four hours; a certain quantity is then decanted—say a quart, for example—and into this is introduced three ounces of well-carded cotton—that used for polishing daguerreotype plates is excellent for the purpose. That all the cotton may be dissolved, the liquid is shaken at frequent intervals, and, after a few hours, this result is obtained, when it must be diluted with a quarter of its volume of water, which, in the example we are considering, would be a quarter of a pint. This liquid is that which serves us in our ulterior preparations. To facilitate this operation, I give the following figures:—

No. 1.	Sulphate of copper of commerce	3 parts.
	Caustic potash	2 "
No. 2.	Liquid ammonia	20 parts.
	Carded cotton	2 "
	And oxide of copper arising from No. 1.	

"M. Peligot's method is perhaps more simple. It is as follows:—

"In a rather large and deep glass funnel, imperfectly covered with a glass plate, put copper filings, or wire, or cut sheet—in fact, anything in the way of metallic copper at hand, provided it is in small pieces. Before putting the copper into the funnel, however, some pounded glass should be thrown in to prevent the liquid which is presently added from running through too quickly; then the copper should be added, and the funnel having been placed in a large glass bottle, the ammonia may be poured on. The copper, on contact with the ammonia and the oxygen of the atmosphere, is converted into oxide of copper, which the ammonia dissolves instantaneously. When all the liquid has passed into the bottle, it is left to itself for an hour, that the copper may oxydise well, and fresh ammonia is then poured on. This operation is then repeated until the liquor shows a very deep blue colour even in thin films. Cotton is then dissolved in it in the proportions given above.

"It is essential that the ammonia, in passing from the funnel into the bottle, should only do so drop by drop, otherwise it is not completely saturated with oxide of copper; besides, the same metal and the same apparatus may serve several times. It must also be observed, that the solution must be left to settle before dissolving the cotton therein, in order that it may be ultimately thoroughly free from impurities.

"It is advisable to perform this operation in the open air, that the operator may be protected from the vapours of the ammonia, which are sufficiently disagreeable even then.

"Let us also observe, that it is highly important to have a well-prepared liquid. To try it, pour a certain quantity on a glass; it must spread slowly and evenly. I have always succeeded badly with a solution too much diluted.

"When it is desired to convert the ammonio-cupric solution into a photographic substance, it is necessary to add about 5 or 6 grains of iodide of potassium per ounce, dissolved in double its weight of water. The liquid thus prepared will serve until exhausted.

"When it is desired to use it, a certain quantity must be poured on a glass, precisely as with the collodion, then the plate must be placed upon end so that the excess of liquid may run off, and the back wiped with a bit of blotting paper, and, while still wet, immersed in a bath composed as follows:

Distilled water	100	parts.
Fused nitrate of silver	10	"
Acetic acid crystallisable	5	"

"The film whitens instantly, and after a few seconds immersion the plate is withdrawn, and the succeeding operations continued as usual.

"It is rigorously necessary to add the acetic acid to the silver bath, because it is this acid which removes the excess of oxide of copper; nevertheless, it is advisable to diminish

the quantity as far as possible; thus, one may take an ordinary bath used for collodion, add to it 1 per cent. of acetic acid, and if, after the development, a black proof is obtained, add to it 1 per cent. more. On the one hand, if there is too much acid, the rapidity of the process is diminished; on the other, if there is too little, black proofs are obtained.

"I have observed that one may succeed with an ordinary bath, strengthened with a very little acetic acid, half per cent. for example, on condition of leaving the proof in the bath for two or three minutes, and raising it from time to time with a whalebone hook; or, otherwise, by plunging the humid glass, first in water strengthened with acetic acid, drawing it out very quickly, and immersing it, after it has well drained, in neutral nitrate of silver. Practice alone can give an exact idea of this, but this is so important, that the time of exposure will be increased ten times, merely by using baths in which the proportions are badly established.

"But there is another point highly important to success, and it is this: when the liquid has been poured on the glass, and the latter has been placed upon the wall to drain, when ought it to be plunged in the silver bath, and what means ought to be adopted to render the action systematic?

"If after half a minute we look at the glass, we shall see a slight whiteness towards the upper part, and that it is still transparent towards the lower; if we then immerse the proof in the silver bath, one end is whiter than the other, and consequently the action of the light upon it is unequal. We must, therefore, wait until the entire of the film has acquired this whitish appearance before immersing it in the silver bath, and to assist this it can be waved in the air, but if the glass dries beyond this point, the rapidity is diminished.

"I ought to say that my experiments are not yet quite in accordance on this point, and not sufficiently numerous to give sound conclusions; but now that the weather has become decidedly favourable, I intend to attempt the perfection of this process by rendering it as simple as possible; for, it must be admitted that it is in itself much more easy than the collodion process; copper may be found anywhere, likewise cotton and ammonia, all at a low price. The purity of these substances is not an essential condition, and the process is extremely simple. If one obtains a good proof, one can rely upon succeeding with all the others. I think, besides, that the process will succeed well dry, judging from the essays I have made; but I will return to this part of the subject by-and-by; my object in giving the preceding information has been to facilitate the attempt of your numerous readers with this method."

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

INSOLATION.

By a further experiment we may render more conspicuous the action of the nitrate of silver on the chloride of this metal. If we rub separately in an agate mortar dry nitrate of silver and chloride of silver, and expose them to the light, both will be seen to become coloured; the first slowly, because, no doubt, it is mixed with the ambient dust; the second with a greater rapidity at first, but which soon slackens. But if we bring the two masses close together with the pestle, the colouring will at once be seen to proceed with great energy at the points of contact. It is an experiment that everybody may verify, and which shows better than any other the influence of the liberation of the chlorine, and consequently of the formation of the chloride of silver in the nascent state, on the progress of the reaction.

We may then, henceforward, understand the respective parts played by the chloride and the nitrate of silver in the act of insolation. To exhaust the subject it remains for us to see what part the size performs in respect to these compounds.

We have long known the influence it exercises in the production of the proof; we also know that, on a sheet of paper without size, the greyish picture which is formed is entirely composed of metallic silver; but is it the same when the compounds we have been examining are in contact with an energetic size? Old experiments, which we are about to recall, enable us to affirm that it is not, and that in this case a combination is effected, under the luminous action itself, between the size and the silver.

By placing in the solar rays bottles containing solutions of gelatine, starch, and albumen, and solution of nitrate of silver in which chloride of silver existed in suspension, we have seen, in all cases, coloured precipitates form, which, collected and washed with very great care, are found to be formed, before the action of the fixing agents, of non-reduced chloride of silver in excess, of metallic silver, and organic matter; and after the action of the fixing agents, of metallic siver combined with an organic matter. The precipitate formed in the gelatinous solution burns with facility, gives carbonic acid with oxide of copper, ammonia with potash, silver by calcination; the precipitate formed in the starch solution burns the same, gives off carbonic acid, &c. It is unnecessary to dwell any longer on these experiments, which we quoted in an early part of our papers. Besides, these combinations offer varieties of colour and intensity, perfectly corresponding with those communicated to the proofs by these same sizes.

The action exercised by the size is therefore very evident; it gives rise, under the luminous influence, at the very moment when the silver is liberated, to combinations of organic matter and silver, presented under different colours that are communicated to the proofs in practical photography. But it was important to ascertain if the action of the size was exercised on the chloride or the nitrate. Experiment showed that it bore more particularly on the latter. If we filter the gelatinous solution used in the preceding experiments, and which, consequently, contains nothing but free nitrate and gelatine, it will still be seen to yield, under the luminous influence, the same precipitate formed of organic matter and silver; and the same result will be seen in the case of starch and albumen. This may be rendered more strikingly evident by preparing the coloured films in the following manner:—We spread on a glass plate a layer of albumen, on another a layer of pure gelatine; after desiccation the two plates were immersed in the nitrate of silver, washed quickly to remove the excess, and exposed to the light. Both glasses became rapidly tinted, assuming the colours proper to each of the sizes—the gelatine acquiring a purple tint, the albumen an orange-red tint. This combination resisted the hyposulphite of soda, which slightly modified the tint, and brought it to a clearer tone.

But if the operation be conducted in such a way that there is only chloride of silver in presence of the size, a slight influence may certainly be remarked, but compared with that of the nitrate it is inappreciable.

Hence, then, it is between the nitrate and the size that this operation is produced, and hence the luminous action exerts itself in a complex manner on the paper, for it colours it by the reduction of the chloride of silver, and by the formation of the combination which is effected between the silver and the organic matter.

In conclusion, let us group the preceding facts, and endeavour to deduce from them a general theory of insolation.

The luminous rays falling on the chloride of silver reduce it to a metallic state; the chlorine which is liberated, encountering the nitrate of silver in excess, decomposes it, forms with it a new chloride, which is acted upon more strongly in the nascent state, and gives greater force and rapidity to the progress of the insolation.

* Continued from vol. ii. p. 89.

The silver thus reduced gives to the print a grey or brownish tint. No doubt it is to the feeble traces of sub-chloride of silver, formed at the same time, that the violet colouring, observable on the removal of the print from the printing frame, is owing, and which afterwards disappears under the operation of the fixing agents.

But the presence of organic matter during the reaction changes the result; a coloured combination of organic matter and silver is formed and fixes itself on the silver of the chloride, and covers the sombre tint of the latter with a more or less rich and intense colouring, according to the nature and quantity of the organic matter employed.

This theory explains all the facts we have hitherto stated; it shows why chloride of silver without nitrate, even in the presence of organic matters, only yields a proof which is dull and without vigour, the blacks of which will not agree in tone. Why, on the contrary, nitrate of silver employed without chloride gives with the size strongly coloured proofs, although harsh and not very agreeable to look at. Finally, why the mixture of chloride and nitrate of silver, in suitable proportions, will give vigorous proofs, to which the size adds the colour.

It likewise allows the explanation of the differences we have pointed out which exist between the different salts of silver, as respects their photogenic sensibility. If we turn back and examine what we have written on the subject of the compounds that may be substituted for the chloride of sodium for salting the paper, we must make the singular observation, that in presence of an excess of nitrate of silver the sensitiveness is greater, as the salt can, by its reduction, set at liberty a more volatile body. Thus, after the chlorides come the bromides, then the iodides, capable of liberating chlorine, bromine, and iodine which constantly forms new argentiferous compounds; and it is only after these that the phosphates, citrates, &c., can be placed.

PRESERVED LIGHT.

To the paper published in the "PHOTOGRAPHIC NEWS" of last week, on the subject of preserved light, we add the following, which we take from *Cosmos*:—

"What is this reducing agent? M. Paul Thenard authorises us to publish a first experiment, which raises the veil a little. He took a white paper, which had been kept in a dark place, and exposed it to the vapour of water, which, consequently, was not only not insolated, but on the surface of which all luminous vibration was really extinct; he rolled this sheet of paper, and introduced it in a tube, through which he then passed a current of active oxygen or ozone, and afterwards closed it. Some time later he opened the tube in a dark room, and placed the orifice over a piece of paper sensitised with nitrate of silver; after the lapse of a few hours he discovered that the silver was reduced on the surface of the sensitive paper, and that the opening of the tube was very clearly designed in black upon it; evidently, this impression could only be attributed to the reducing action of the ozone. Nevertheless, strange to say, when he caused a current of ozonised air to pass into a tube containing a sheet of sensitised paper rolled round the inside, there was neither a reduction of silver, nor any visible impression on the surface of the paper. This double experiment was many times repeated by Messrs. Bouilhon and Sauvage, and always with the same results."

We have been informed by Professor Wheatstone that a distinguished French *savant* has likewise tried various experiments with ozone, with the view of ascertaining the cause of the phenomenon which has excited so much discussion, and although on opening one of M. Niepce's insolated tubes an odour similar to ozone was clearly perceptible, an experiment in which he attempted to discolour chloride of silver, by means of ozone, failed to prove that this body was capable of exerting any action.

Critical Notices.

The Stereoscopic Treasury. London: A. W. BENNETT.

DURING the past few years the improvements and alterations which have been made in the shape and adaptability of the stereoscope are truly surprising. At one time the instrument, compared with the kinds now in use, was heavy, unwieldy, and inelegant; now we have artistic and neat designs which, while they are a great advance optically, are also superior in point of taste. Among the various styles which we have seen, there are certainly none which excel the "Clairvoyant Stereoscope" in point of utility, elegance, compactness, and general adaptability; the focusing—usually a difficult matter in the best instruments—is obtained in this one so easily and correctly that even those who usually find great difficulty in using the stereoscope could not fail with this at once to obtain the desired effect. The instrument, by an ingenious device, is equally applicable to opaque and transparent pictures, and is made so as to fit into a compact case, in which may be stored a small library of stereograms. We are sure that it well deserves its title of "Stereoscopic Treasury," and needs only to be known to recommend itself.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

Handling.—When a student of painting has become sufficiently skilful to feel sure of his touch, he naturally steps out from the very cautious style of proceeding with his picture, and feels a desire to produce effects more and more telling, until, ultimately, if he succeed, a masterly, forcible style of execution results. He no longer feels it necessary to stipple so faintly and so finely; and whereas, at first, he would not have thought it prudent to venture to lay on his colour more boldly than in scarcely visible dots or short strokes, from the fear of destroying the form of any part, he now can safely finish his picture in palpable lines. This is done to imitate the fine racy effect visible upon steel engraving; and, when conducted with due care, it produces a wonderful relief. To accomplish this end, having got on almost the full effect of colour, light, shade, and form, as directed in preceding chapters, the head may be gone entirely over again with touches, very fine, yet palpable, composed of the right colour for each place worked upon, and keeping the touches lighter in light parts, and stronger in shadow. The direction of these strokes will be suggested by the form of the feature they represent; for instance, on the front of a forehead, being nearly flat, they would be comparatively horizontal lines, whilst rounding down the sides of plump cheeks, they would be curved to produce rotundity.

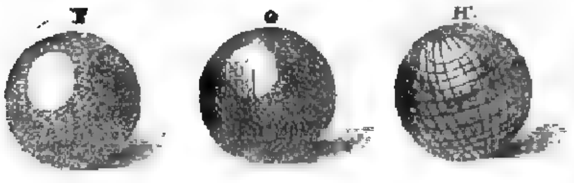
The colour used will be regulated also, in some measure, by what is previously laid on; and, as warm colour tells best over a cold one, those underneath being cool, these lines will be made in warm colours. And it is well to observe that, in the preparatory stages, you should use such colours in every place as will, when worked over with this warm colour, produce the tint required. As, for instance, that pink, pearly hue round about the eyes in fair people—having washed them in previously with blue, if you line over that with lake, the effect is complete, and may be modified to suit any complexion: bilious people are rather yellow about their eyes, in which case add yellow to the lake.

The lines should not cross each other diagonally, as seen in Fig. 1, but as seen in Fig. 2. The interstices are to be filled up with dots, as in Fig. 3.

Fig. 1. Fig. 2. Fig. 3.

This process gives such a raciness of effect and finish, that

when properly conducted no picture bears comparison in point of force, as will be seen below in figures F, G, and H.



Without lines. The process recommended. Too hard and formal; lined before the shadows were worked up.

The cause of a head finished in this way standing in stronger relief than if without lining, arises from the circumstance, that each line and touch makes of itself a distinct impression upon the eye, and comes out, from a similar principle that a distinct sound seems nearer than a soft one.

One thing more on this part of our subject: never think of using this lining finishing process until the effect of light and shade is almost complete—the likeness also; otherwise you will get on a hard, powerful effect like network, perhaps destroying the likeness; and upon this network you cannot regain it without extreme difficulty, because it prevents you seeing the light and shade so well.

(To be continued.)

Dictionary of Photography.

Chromate of Silver.—A deep red salt, formed when a soluble chromate is mixed with nitrate of silver solution. Chromate of silver is almost unchanged in the light, even after an exposure to sunshine for many days, but it eventually assumes a darker shade.

Chrome Yellow.—This name is applied to chromate of lead when it is used as a paint. It has been fully described above.

Chromatic.—Relating to colour; having colour: in contradiction to achromatic, which means devoid of colour.

Chromatic Aberration.—See *Aberration*.

Chromatype.—A photographic process in which the sensitiveness of copper to light is employed, in conjunction with other chemicals, to produce a picture. It is thus described by its discoverer, Mr. R. Hunt:—One drachm of sulphate of copper is dissolved in one ounce of distilled water, to which is added half an ounce of a saturated solution of bichromate of potassa; this solution is applied to the surface of the paper, and when dry it is fit for use, and may be kept for any length of time without spoiling. When exposed to sunshine, the first change is to a dull brown, and if checked in this stage of the process, we get a negative picture; but if the action of light is continued, the browning gives way, and we have a positive yellow picture on a white ground. In either case, if the paper when removed from sunshine is washed over with a solution of nitrate of silver, a very beautiful positive picture results. In practice it will be found advantageous to allow the bleaching action to go on to some extent; the picture resulting from this will be clearer and more defined than that which is procured when the action is checked at the brown stage. To fix these pictures, it is necessary to remove the nitrate of silver, which is done by washing in pure water; if the water contains any chlorides, the picture suffers, and long soaking in such water obliterates it—or, if a few grains of common salt are added to the water, the apparent destruction is rapid. The picture is, however, capable of restoration, all that is necessary being to expose it to sunshine for a quarter of an hour, when it revives, but instead of being of a red colour it becomes lilac, the shades of colour depending upon the quantity of salt used to decompose the chromate of silver which forms the shadow parts of the picture. Mr. Bingham remarks on this process, that if we substitute sulphate of nickel for sulphate of copper, the paper is more sensitive, and the picture is more clearly developed by nitrate of silver. The following modification of this process possesses some advantages. If to a solution of sulphate of copper we add a solution of neutral chromate of potassa, a very copious brown precipitate falls, which is a true chromate of copper. If this precipitate, after being well washed, is added to water acidulated with sulphuric acid, it is dissolved, and a solution formed, which, when spread upon paper, is of a pure yellow. A very short exposure of paper washed with this solution, is sufficient to discharge all the yellow from the paper, and give it perfect whiteness. If an engraving is to be copied we proceed in the usual manner; and we may either bring out the picture by placing the paper in a solution of carbonate of soda or potassa, by which all the shadows are represented by bichromate of copper, or by washing the paper with nitrate of silver. It may sometimes happen that, owing to deficient light, the photograph is darkened all over when the silver is applied; this colour, by keeping, is gradually removed, and the picture comes out sharp and clear. If the chromate of copper is dissolved in ammonia, a beautiful green solution results, which, if applied to paper, acts similarly to those just described. The chromatype pictures, under certain conditions, afford a beautiful example of the changes which take place slowly in the dark, from the combined operation of the materials employed. If we take a chromatype picture, after it has been developed by the agency of either nitrate of silver or of mercury, and place it aside in the dark, it will be found, after a few weeks, to have darkened considerably, both in the lights and in the shadows. This darkening slowly increases, until eventually the picture is obliterated beneath a film of metallic silver or mercury. But while the picture has been fading out on one side, it has been developing itself on the other, and a very pleasing image is seen on the back. After some considerable time the metal on the front gives way again; the paper slowly whitens, and eventually the image is presented on both sides of the paper, of equal intensity, in a good neutral tint upon a grey ground.

(To be continued.)

A Catechism of Photography.

PHOTOGRAPHIC EXCURSIONS.

Q. What photographic process is most useful for taking views during an excursion?

A. The photographic processes on paper or on glass only, are really useful to travelling photographers. The dry wax paper process is excellent for this purpose; but albumen or dry collodion may be equally well employed. The principal objection to collodion is, that the weight and size of a large number of glass plates render it inconvenient; whereas hundreds of sheets of prepared paper may be carried without increasing a traveller's luggage to any great extent.

Q. What materials are really essential to a travelling photographer?

A. The necessary apparatus may be divided into three distinct parts:—1st, referring to an excursion of a few hours, or a few days at farthest; 2nd and 3rd, to a prolonged journey.

Q. What materials make up the first series?

A. The camera; lenses in their box; glass frame, or a frame of Bristol board; portfolio, for holding on one side the prepared paper, and on the other the impressions taken; a camera stand; a black cloth to put over the head in focussing; and a view-meter, used in focussing the picture in the camera.

Q. What is included in the second series?

A. Two bowls, of earthenware, glass, or wood; three gutta percha dishes fitting into one another; three gutta percha funnels of different sizes; a silver rod; waxed and iodised paper; white blotting paper; filtering paper; scales

and weights; some glass plates; four camel's hair brushes; flask of aceto-nitrate of silver; cyanide of potassium; pure nitrate of silver; acetic acid; gallic acid; and bromide of potassium.

Q. What is included in the third series?

A. Negative and positive paper; white wax; solution of iodide of potassium; iodide of potassium; sugar of milk; iodine; hyposulphite of soda; and a frame for reproduction.

Q. What is the best size for a travelling camera?

A. It should be capable of taking pictures 21 by 27 inches, and be fitted with a lens of long focus. The lens should be of a diameter and focus proportionate to the size of the image; so that it is advisable to carry three or four different lenses, which may be shifted and adapted as circumstances may require.

Q. For what purpose is the glass or paper frame employed?

A. For changing the prepared paper in the open air, under a tent or curtain arranged on the camera stand. The glasses must be thoroughly clean, and well polished before starting. It is well to paste at the back a yellow paper, which prevents the action of the light, if the frame is opened during the journey.

Q. What description of portfolio is used?

A. The portfolio is made of blotting paper inclosed in a black case; on one side are placed the prepared papers; on the other, papers on which photographic impressions have been taken.

Q. What sort of camera stand should be used?

A. A stand that will fold into a convenient compass, and that will admit of the camera being on a level with the head of the operator, is all that is necessary.

Q. How is the view-meter employed?

A. It is used for fixing in an easy and accurate manner the spot where the camera should be placed for taking a large-sized view. The tube is either of copper, tin, or simply of cardboard; one end is closed by a disc pierced with a round hole, to which the eye is applied; the other end is a square opening, the sides of which are proportioned to those of the camera. The size of the opening and the length of the tube are regulated, so that, on applying the eye to the instrument, the same field is presented by that which would be received on the ground glass slide of the camera. This contrivance is found exceedingly useful to operators, and is very easily constructed.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 10, 1859.

ONE of the largest and finest collections of photographs in the Paris Exhibition is a series of reproductions of pictures, ancient and modern, by Signors Caldési and Montécchi, of London. Among them the most valuable and the most remarkable are fourteen photographic copies of the famous cartoons of Raphaël; some of these splendid proofs are 3½ feet long (without the frame). "The Sacrifice at Lystra," original size 18 feet by 11 feet 4 inches (photographic proof about 3½ feet long); "The Death of Ananias," "Elymas the Sorcerer struck with Blindness," "Peter and John Healing the Lame Man at the Gate of the Temple," are, perhaps, the finest. It is difficult, however, to draw distinctions between these gigantic productions. To amateurs of ancient pictures, or engravings and works of old masters, the photographs of these cartoons must be very interesting. They are colossal works of photography. Messrs. Caldési and Montécchi's photograph of "Grisi and Mario, in the *Trovatore*," taken from nature, is a good and pleasing proof. Mario's likeness is excellent.

In M. Braun's collection, which we mentioned in one of our first letters, there is a "Panorama of Mulhouse," a large view composed of three proofs, which is without a rival here, and has been universally admired.

M. Maxwell Lyte has exhibited 23 views of the country about the Pyrenees, and some other proofs besides stereoscopic slides. M. Maxwell Lyte enjoys here the reputation of a first-rate photographer. His views do him, indeed, much credit; but these proofs, taken on collodion and developed with phosphate of gold, have a black, disagreeable look about them, which we cannot term a fine tone, nor would it, in a picture, be called "strength of colour."

M. De Campigneulles' views, taken in Nubia, Egypt, &c., are extremely interesting in a geographical point of view. This Parisian photographer has exhibited nearly 40 different proofs. Such scenes as "Views of Damascus," details from "Thebes," "Mount Sinai," &c., are certainly very attractive, and cleverness of execution adds beauty of design to the interest of the subject.

The same observations are applicable to the large collection of views from the Holy Land, by Mr. Graham, of Jerusalem. He has exhibited from 40 to 50 very interesting proofs. We have, in the first place, a very large view of the "Town of Jerusalem," composed of four proofs joined together, and which is from 3 to 4 feet in length by nearly 1 foot broad. Then, another view from the "Mount of Olives," composed of 3 proofs; and, finally, 29 other partial views representing monuments, churches, and other details of the town and the country around it. Next to them are views of "Bethlehem," "Nazareth," "Rhodes," and some other very beautiful photographs of "Cairo," and the "Egyptian Pyramids," &c.

In the same manner Mr. Clifford, of Madrid, has added to the interest of this exhibition by his views of "Madrid," "Salamanca," "Barcelona," "Toledo," &c.; whilst M. De Constant-Delessert has furnished us with some Swiss views; Sig. Cuccioni, with views of Rome and its environs; Mr. Roger Fenton, with English scenery; Herr Flotwell and Herr Krone, with German sites; Sig. Naya, of whom we have already spoken, and Sig. Sinigaglia, who has given us panoramas of Venice and Milan, with Italian subjects. Dr. Lorent exhibits scenes from Algiers; Messrs. Maxwell Lyte, Civiale, and Mailand, views from the Pyrenees; M. de Nostitz, a general view of Tiflis (Caucasus); M. Piot, views of Athens, and other Grecian towns; and M. de Rumine, of St. Petersburg, has photographed the journey made last year by the Grand Duke Constantine in the Mediterranean. M. Stahl, of Pernambuco, side by side with his "Types of Negroes and Negresses," has given us 3 very interesting views of Pernambuco; and M. Varin, 11 views taken in Corsica, &c., &c., without naming a host of views of Paris and other French towns and their environs by other photographic artists.

In a future letter we intend to mention some of the *curiosities* of this exhibition.

We record with much grief the death of the illustrious Alexander Von Humboldt. A telegraphic dispatch which arrived here on Saturday last, informs us that the whole of Berlin is in mourning for this great man, who has just left us for a better world.

Alexander Von Humboldt was born on the 14th September, 1769; he had, therefore, nearly accomplished his 90th birthday. After going through the ordinary course of education at Göttingen, and having made a rapid tour through Holland, England, and France, Von Humboldt became a pupil of Werner, at the mining school of Freyberg, and in his 21st year published an "Essay on the Basalts of the Rhine." He afterwards travelled in Austria, Switzerland, Italy, and France. In 1799 he went to Spain with the intention of entering Africa from Cadiz, but the unexpected patronage he received at the court of Madrid induced him to proceed to the Spanish possessions in America. His travels in America with Boussingault (now of the French Institute) extended to 1804, during which interval he made

researches in geology, botany, physical geography, meteorology, &c., which have rendered his name and his works immortal.

In 1805 Humboldt made an excursion to Naples with Leopold Von Buch and Gay-Lussac, two of the greatest natural philosophers of their day, and the succeeding twenty years of his life were spent in Paris, almost exclusively employed in editing the results of his American journey. In 1817, after twelve years of incessant toil, four-fifths of the work were completed, and an ordinary copy of the part then in print cost considerably more than £100 sterling!

In 1828 this great *savant* undertook a scientific journey to Siberia, under the especial protection of the Russian government, and in company with the distinguished philosophers Ehrenberg and Gustav Rose. The results of this expedition have been published in his "Fragments Asiatiques," and his "Asie Centrale," and in Rose's "Reise nach dem Oural."

The enormous scientific and literary productions of Alex. Von Humboldt include his—"Relation Historique du Voyage aux Régions Equinoxiales" (personal narrative, &c.); "Nouvelles Annales des Voyages;" "Essai politique sur la Nouvelle Espagne;" "De Distributione Geographicâ Plantarum;" "Essai sur la Géographie des Plantes;" "Recueil d'Observations Astronomiques;" "Flora Friburgensis subterranea;" "Essai Géognostique sur le Gisement des Rôches;" "Examen Critique de l'Histoire de la Géographie;" "Atlas Géographique et Physique du Nouveau Continent;" "Monuments des Peuples Indigènes de l'Amérique;" "Tableaux Physiques des Régions Equinoxiales;" "Recueil d'Observations de Zoologie et d'Anatomie Comparée;" "Views of Nature;" and his well-known "Cosmos," which Professor Bunsen has styled "the great work of our age;" besides a number of minor works and memoirs in the "Annales de Chimie," the "Annales des Sciences Naturelles," and the "Journal de Physique," &c. &c.

"If the 'Asie Centrale,'" says Miss Otté, "had been his only work, constituting as it does an epitome of all the knowledge acquired by himself and former travellers, on the physical geography of Northern and Central Asia, that work alone would have sufficed to have formed a reputation of the highest order."

We have also to notice another great loss which science has just sustained in the person of the well-known French chemist and toxicologist, M. Lassaigne, member of the Paris Academy of Medicine, and of many other learned societies.

Our accomplished friend M. F. Pisani has lately received from Constantinople samples of a new mineral found in the interior of Turkey, and which presents rather a remarkable composition. This mineral forms large stalactites in caverns near a mine of copper pyrites; its colour is that of sulphate of copper in the parts freshly broken, whilst its crystalline form is that of sulphate of iron. On analysis it turns out to be sulphate of protoxyde of iron, in which part of the oxide of iron is replaced by oxide of copper. The figures obtained in M. Pisani's analysis lead to the formula:

$$\left.\begin{matrix} Fe \\ Cu \end{matrix}\right\} O, SO^3 + 7\ HO.$$

We have also analysed this new mineral, and the results we have obtained coincide completely with those of M. Pisani. The formula given above is that of common green vitriol, in which a certain quantity of iron is replaced by copper. It is probable that the natural production in question has been formed in the waters that filter through the beds of copper pyrites, and that it could be formed artificially in the laboratory.

The celebrated Dutch chemist, Mulder, has lately made known a pretty reaction, which serves to determine the presence of glucose or fruit-sugar in a solution. He found that a solution of indigo in Nordhausen sulphuric acid is rendered colourless by glucose in presence of an alkali. The indigo blue is thus transformed into white indigo. This reaction, which takes place at the ordinary temperature of the atmosphere, is hastened by heat. The blue colour is reproduced if the solution be shaken for a little time, *i.e.*, by the action of the oxygen contained in the air of the flask; and if, instead of water, alcohol be used to dissolve the glucose, the newly formed indigo blue is deposited in a crystalline state.

This reaction of indigo does not take place with cane-sugar; hence we have in these phenomena another means of distinguishing between these two species of sugar.

M. Pierrot recommends *valerianate of ammonia* as a specific against neuralgia, hysteria, &c., but more especially as a cure for epilepsy. Valerianate of ammonia is a clear liquid of a brown colour, and has a strong odour of valeriane. (It is, therefore, an acid valerianate that M. Pierrot speaks of, for if a sufficient quantity of ammonia be added to neutralise the excess of acid, the liquid becomes one mass of delicate radiated crystals.) The ordinary dose for an adult is a teaspoonful morning and evening in sugar and water; for children, the half or the quarter.

The Society of Naturalists of Dantzic propose as the subject of a prize essay for the year 1861, the determination of the orbit of the periodic comet of Faye, the third comet of 1843, from its apparitions in 1843-44, 1850-51, and 1858. Account must be taken of the perturbations which the comet has experienced, and will have to undergo whilst continuing its course in the heavens, until its return to our part of the world in 1865-66, for which it will be also necessary to calculate ephemerides. The prize to be awarded is 711 francs; the competition remains open until the 1st September, 1860.

There is a talk at Paris of a new regulator for the electric light invented by M. Serrin, which appears to offer many advantages, but we have, as yet, no account of the construction of this apparatus. All we know of it is, that it is destined to separate the charcoal conductors as soon as they come in contact; so that no manipulation is needed to effect this.

GLASGOW PHOTOGRAPHIC SOCIETY.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—Can you inform me of the doings of the Glasgow Photographic Society? What about their exhibition to take place "in the month of March?" I sent them, at their request, specimens for exhibition (I trust it is not possible that I can be promptly identified by this statement), and have heard or seen nothing of the exhibition since. Was it intended to be held on the *first* of April? NEMO.

Photographic Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on the evening of the 4th instant, at the rooms of the Literary and Philosophical Society. Mr. Lund in the Chair.

Mr. Mann, the Hon. Sec., read the following letters to the Society:—

"GENTLEMEN,—At the last meeting of our Society, I claimed for our member, Mr. Dancer, the merit of being *one of the* first to produce microscopic photographs, on account of paragraphs having lately been in the newspapers claiming for certain parties the invention, and as being something quite new. Mr. Shadbolt, the Editor of the *Photographic Journal*, has replied to my remarks, and calls upon me to give further particulars, as he has always considered himself to be the originator of micro-photographs.

"My remarks are not intended to apply to Mr. Shadbolt, but as he has taken the matter up, I have no option but to reply to his letter; and now claim for Mr. Dancer, not that he was '*one of the first*,' but *the first* who produced these photographs.

"I repeat, then, that I have two specimens of microscopic photographs, given to me by Mr. Dancer, in the spring of 1853;

they are mounted with Canada balsam, as microscopic objects, on the ordinary size of microscopic glasses. I may also say that Mr. Dancer at the time informed me how they were taken, and in the autumn of the same year, I followed his instructions, and (although not very successfully) I produced some of these minute photographs, and have them still in my possession.

"That there may be no mistake in the dates, I inclose two letters, one from Mr. Dancer, the other from Mr. Binney, confirming my statement. "JOSEPH SIDEBOTHAM.

"*May 4th*, 1859."

"*Manchester, May 2nd*, 1859.

"MY DEAR SIR,—I duly received the letter in which you call my attention to an article on the 'Origin of Microscopic Photographs,' by Mr. Shadbolt, printed at p. 104 of the May number of our Society's journal; and as Mr. Shadbolt requests you will read his communication to the Society, I must beg as a favour that the members present will listen to the contents of this letter, which shall be as brief as possible, and accept an apology for occupying their time with a matter so purely personal. The question at issue between Mr. Shadbolt and myself is simply this:—Did I produce microscopic photographs before March, 1854? In reply I can state that even on collodion I had produced microscopic photographs in February, 1852; I named these minute pictures microscopic photographs, and this name I still employ. The word micro-photograph I have no claim to whatever. As the monumental tablet to Mr. Sturgeon was raised in your statement to the Society, and is also alluded to by Mr. Shadbolt, I will confine my remarks more especially to it. The tablet in question was photographed on the 25th April, 1853, and reduced for the microscope early in the following month. Some of the early specimens were presented to E. W. Binney, Esq., F.R.S., F.G.S., &c., of this town; S. Salt, Esq., now of Westport, Ireland; S. W. Williamson, Esq.; A. Neild, Esq.; two of our own members, and yourself. This and other microscopic photographs were well known in this locality, long before they had been supplied by me to dealers in such articles; but when they first reached London I cannot say.

"I do not for one moment suppose that Mr. Shadbolt was aware of their existence previous to his own production. To remove all doubt as to the accuracy of the foregoing dates, I inclose a copy of a letter which I have this day received from E. W. Binney, Esq.; this letter relates especially to the tablet in question, and it, in addition to your own testimony, will, I hope (as regards the question of dates), be satisfactory to Mr. Shadbolt.

"I cannot conclude this letter without expressing my great surprise at a statement which appears in Mr. Shadbolt's paper, the substance of which is as follows:—That about March, 1855, Mr. Thornthwaite showed to him a copy of Sturgeon's tablet, which Mr. T. alleged to have procured the production of, in consequence of what Mr. Shadbolt had shown to him. No doubt this has been some misinterpretation, which Mr. Thornthwaite will be able to explain in a satisfactory manner.

"I regret that your friendly feeling should have involved you in this controversy.—Yours very truly, "J. B. DANCER.

"Joseph Sidebotham, Esq."

"*Manchester, May 2nd*, 1859.

"MY DEAR SIR,—On referring to my papers I find that it was in April, 1853, when Dr. Joule, F.R.S., myself, and another, got the tablet in memory of our old friend the late Mr. Wm. Sturgeon, executed by Mr. Latham, sculptor, Manchester. On Saturday, the 23rd of April, I took you to Mr. Latham's place, then in Portland-street, to look at the tablet, and when there requested you to photograph it for me before it went to Kirby Lonsdale to be put up in the church. On that same day, Mr. Latham, by my orders, took the tablet up to your house in Ardwick. It came back to his place in the early part of the following week, and on Thursday, the 28th of April, it went off to Kirby Lonsdale, and was placed in the inside of the church there. Within a month of the last named date, in the end of May, 1853, you presented me with a micro-photograph of the tablet, which I received with much gratification and surprise, having expected only a common, and not a micro-photograph from you. I most certainly never gave Mr. Thornthwaite, or any other person, liberty to photograph the tablet; and Mr. Latham assures me that no one but yourself had any opportunity to take a photograph of it prior to its going to Kirby Lonsdale. Believe me to remain, my dear sir, yours truly,

"EDWARD WM. BINNEY.

"J. B. Dancer, Esq., F.R.A.S., Manchester."

Mr. Wm. Crookes, the Editor of the "PHOTOGRAPHIC NEWS," was elected an honorary member of the Society.

The Honorary Secretary stated that Mr. Crookes had sent the 1st volume of the "PHOTOGRAPHIC NEWS" for presentation to the library of the Society; also a print of his magnified photograph of the Moon, for the Society's portfolio. A vote of thanks was unanimously passed to Mr. Crookes for his presents.

A vulcanised rubber tray, made by Messrs. Macintosh and Co., at the suggestion of Mr. Sidebotham, was shown to the members.

Two large and exceedingly beautiful prints, from collodio-albumen negatives, were presented to the Society's portfolio, by Mr. Lund. A very compact exposing camera was exhibited by Mr. Mudd.

Mr. Norton exhibited his contrivance for beating up albumen, and beat up a quantity of albumen in a few minutes into a very solid froth. The apparatus was highly approved of by the members, effecting the object in a most satisfactory manner and with very little trouble. A vote of thanks was unanimously passed to Mr. Norton, for having exhibited the working of the apparatus to the society.

Mr. Higgins exhibited some sensitised papers which had been kept a month in one of Mr. Mudd's boxes, and which had remained quite white.

Mr. Mudd exhibited one of the boxes contrived by him for the purpose, and explained the same to the members.

Mr. Mabley exhibited some sensitised paper which he had kept white for sixteen days, simply in an ordinary drawer, with some chloride of calcium. It was stated that the chloride of calcium would do over and over again, if dried when damp.

Mr. Mudd said that he intended to make a box for keeping collodio-albumen plates with the aid of chloride of calcium; and it was generally thought by the members that by such a plan the collodio-albumen plates might be preserved longer than it is at present possible to keep them.

Thanks were passed to Mr. Lund for officiating as chairman, and for his donation of the photographs to the Society's portfolio, when the proceedings closed.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

A MEETING was held on Monday, May 10th, at the library of the Walworth Literary and Scientific Institution, to take preliminary steps for the formation of the above society. Mr. A. H. Wall being voted to the chair, that gentleman proceeded to explain his views in organising the present meeting, and suggested such matters as called for immediate discussion.

Mr. G. Shadbolt proposed—"That the present meeting constitute the South London Photographic Society as an independent body. That the subscription be half a guinea annually, and that members of the Walworth Literary and Scientific Institution be admitted as members of this society, upon payment of an annual subscription of six shillings." Mr. Harvie having seconded this motion, it was carried.

Mr. W. Ackland proposed, and Mr. J. Howard seconded—"That this society hold monthly meetings (with a recess), organise an exchange club, supply a journal periodically as published, and present a photograph annually to each member of the society, when a sufficient number of members shall have raised the necessary funds." Mr. Ackland's motion was then carried.

Mr. Shadbolt proposed, and Mr. Ackland seconded—"That eight or nine meetings be held during the year, and that ten shillings per evening be offered for the use of a large room behind the Lecture-hall, Carter-street, Walworth, for meetings to be held on the second Thursday in each month, if confirmed by the next meeting." Carried.

It was then proposed by Mr. J. Howard, seconded by Mr. Luke, and carried—"That the first public meeting of this

society be held at eight o'clock on the evening of the second Thursday in June next, in the room adjoining the Walworth Lecture-hall."

It was moved by Mr. Armstrong, seconded by Mr. J. Hood, and carried, that ladies be eligible as members.

It was also proposed by Mr. Armstrong, seconded by Mr. Shadbolt, and carried unanimously—"That the following gentlemen be appointed a provisional committee for the formation of the society, viz., Messrs. Ackland, Cotton, Harvie, Howard, Luke, and Wall." Messrs. Rogers and Stevens took an active part in the discussions, and the meeting terminated at a late hour.

Miscellaneous.

ACTION OF LUNAR LIGHT.—Of all known substances chloride of silver is that which alters most strongly and rapidly in colour under the influence of solar light. Nevertheless, observations of old date seemed to have proved that a layer of this chemical compound, exposed for a great length of time to the action of moonlight, not in its ordinary diffused state, but concentrated by means of an immense lens, lost nothing of its primitive whiteness. But since the discovery of Messrs. Niépce and Daguerre photographers have had at their disposal a goodly number of highly sensitive chemical compounds, which are readily acted upon by the lunar rays, and photographic images of our satellite can be easily obtained, as I prophesied would be the case so long ago as 1840. One cannot find, therefore, in comparisons of this kind, the proof that the darkening of the skin cannot be attributed to a direct action of the lunar light; hence I am afraid to entirely deny the correctness of popular observation. The way in which I think it may be accounted for, without having recourse to a chemical action, the intensity of which is certainly very trifling, is as follows:—When we receive the light of the moon on the face, the sky is clear; when the sky is clear there is a radiation of heat from all parts of the skin exposed to the atmosphere, and the necessary consequence is a notable lowering of the temperature of those parts. The skin exposed to the lunar rays would apparently, as in the case of inanimate substances under identical circumstances, be reduced to a temperature from 6 to 9 degrees below the temperature of the air. It is true that the animal heat arrives every instant to the face, so as to diminish, if not entirely make up, the deficit arising from the radiation. It is likewise true that the skin is scarcely ever cooled to such a point that dew will form upon it; nevertheless, who can affirm that the physical conditions in which the epidermis is placed by a very intense local cold may not alter its texture, or modify its tint? The tan of the bivouac—this tan which manifests itself exclusively on severe nights—does it not appear as if it could only be considered as the effect of radiation from the skin? We see that, by this hypothesis, the moon exercises no kind of action in the production of these phenomena; she simply indicates a clear sky. There is a proverb current in the south of France to the effect that exposure to the night air on a clear night darkens the skin.—*From Vol. V. of Notices Scientifiques.*

Photographic Notes and Queries.

CAUTIONS TO BE ATTENDED TO BY PHOTOGRAPHERS.

Success in photography depends so much on a close attention to the "thousand and one" niceties of manipulation, that the writer has thought a series of *cautions* on the points most productive of failures may be likely to prove of material use to those who are desirous of acquiring skill in this most fascinating art. His own knowledge of it has been obtained from the best of all teachers, experience, and he is desirous that others should be saved, at least, some of the labour and annoyance that he has himself had to undergo. The following observations are more especially intended to apply to the paper processes, but some of them will be found equally useful to the practitioner in albumen or collodion:—

1. A scrupulous attention to cleanliness is essential in all photographic operations, and without it *failure is certain.*

2. Carefully exclude *all* white light from the operating room, covering the edges and bottom of the door with broad list, and stopping the keyhole (if there is one). The neglect of this is productive of uncertainty, and imperfections of various kinds.

3. If a strong light falls on the window, do not trust to yellow *calico* for a blind, as it will certainly fade. Yellow *paper* will retain its colour, and answers well. A few thicknesses, pasted on a frame, and hinged to the window, will allow of the daylight being admitted when requisite, and will be found convenient.

4. Avoid having, or causing, dust in the room when at work. To secure this it should be swept at times when it will not be required for some hours; and, at all times, as little stir must be made in it as possible.

5. Keep always ready a sufficient number of *thoroughly clean* cloths, and apply each to only one purpose; arranging them so as to be readily distinguished and found in the dimmest light. Two or three old and soft silk handkerchiefs and a piece of wash-leather (all, of course, clean) will also be found useful.

6. Be careful that all blotting paper used in the progress of a picture is quite clean. The smallest stain will be productive of mischief if it come in contact with a sensitive surface.

7. Keep all solutions containing gold or silver in a small dark closet in the operating room, as they are always liable to injury from exposure to the light.

8. Every bottle should be distinctly labelled. It is useful to have them of *various* shapes and sizes, as when working almost in darkness they are more easily distinguished, and thus mistakes are less likely to occur. The latter caution is also useful with glasses.

9. When slops occur (as they will do) on the work-table, they should be, as soon as possible, wiped up with a cloth or sponge, kept especially for the purpose; and the hands, when soiled or wetted, should be immediately wiped, and, as early as convenient, well washed.

10. Filter all solutions, immediately before using them, through a new filter of fine white blotting paper.

11. Clean all dishes, glasses, &c., as soon as possible after using them. If this cannot be done immediately, much subsequent trouble will be saved by filling them with water, and letting them remain so till they can be cleansed.

12. Dishes used *only* for exciting the papers are easily cleaned by a brush and water, with an occasional use of cyanide of potassium, as stated below.

13. Those used for developing require more care. They should first be well scrubbed with a brush and water, especially the corners, and when *apparently* clean, a little solution of cyanide of potassium (10 grains to 1 ounce of water, but the strength is not material) should be poured into them, and the brush again used vigorously. If already clean this will remain colourless, but if otherwise it will become *red.* In this case a second quantity should be applied, which will, by remaining colourless, show them to be chemically clean, and a rinsing with hot water will fit them for use. When again required, rub them well with a clean linen cloth, and take care that no dust or other matter remain upon them.

14. Be careful to employ none but perfectly pure chemicals, which it is easy to do by purchasing only from really respectable dealers.

15. Never open bottles containing strong acids or ammonia whilst operating, as the vapours are injurious to the work, and whenever used, the room should be afterwards well ventilated.

16. If any solutions require to be evaporated, it is best done out of the operating room, as the vapour may cause injury, and will certainly produce dampness. ALIQUIS.

SENSITIVE PLATES AND THE CUSTOM HOUSE.

SIR,—Respecting your correspondent's inquiry as to the examination of sensitive plates, I am enabled to inform him, that on landing last summer at Antwerp, I had a great deal of trouble about them. The authorities of the *douane*

seemed not to know what to do, and I was referred from one to the other, all insisting on having them opened, which of course I did not agree to; so at last the highest *chargé* on board, Monsieur le vérificteur, decided that I should pay the duty, which was to be something like 16 francs, for a quarter-plate lens, a small camera, and two dozen plates. Having nearly given the whole affair in charge of the captain to take them back to England, I tried as a last chance to propose to the custom-house officers to have them forwarded *in transit*. to Germany. After a deal more bother, they consented to this, and having almost missed the train, off I started at last, having the pleasure of the company of one of the douaniers through the town to the railway station. Coming to Cologne, they began to make the same fuss about it, but after convincing them by rattling the boxes that they only contained glass, it was settled to let them pass unopened, by paying the duty chargeable for coloured glass, which amounts to about 18s. per cwt., so that I came off with about one shilling for duty on glasses and the whole of the apparatus. Coming back to England, the custom-house officers are generally satisfied if they see the name of an English maker either on the lens or any other part of the apparatus.

It would be a good plan if the manufacturers of the different sensitive plates would give a translation of the directions they generally paste on the boxes, both in French and German. E. S.

THE HONOURABLE MAJOR FITZMAURICE'S NEW LIGHT.

SIR,—Some months ago I saw in the "PHOTOGRAPHIC NEWS" a request for information concerning the Hon. Major Fitzmaurice's new light; I now send you the enclosed paragraph which I cut from the local paper:—

"THE NEW GAS LIGHT.—On the evening of the 3rd inst., the Hon. Major Fitzmaurice, who for some time past has been visiting Bournemouth, exhibited at the Belle Vue Assembly Rooms and openly in the town his *Grand and Domestic Lights*, the power of which promises to out-distance the lighting power of our present ordinary street gas, as much even as that gas surpassed the old oil lamps. At the Assembly-room the 'domestic light' was exhibited, a single burner of which, fed from a portable cylinder of compressed gas, instantly made the ordinary lights that surrounded the room appear so dull and opaque by comparison that it was quite immaterial whether they were put out or kept burning, so unappreciable was their contribution to the intense and yet not over dazzling light given out by the new gas. Major Fitzmaurice has for some years past devoted his attention to the subject of the improvement of gas, and it has long been a favourite subject of investigation and research amongst the scientific how those intense lights known as the Bude and the Electric could be obtained, not merely as illustrations of experimental philosophy for the Polytechnic and lecture-room, but by means economical, safe, and certain, failing which, our present discoveries beyond common gas have resulted only in brilliant experiments. After many years of application Major Fitzmaurice has succeeded in obtaining an improved gas, and this discovery is now protected by a patent and ready for being practically applied to the lighting of towns, and, in fact, threatens to supersede altogether the present obnoxious gas obtained in the usual method from coal. We gather from the explanatory remarks made by the Major at the Assembly-rooms, that the following are the grounds upon which the superiority of the new gas is asserted. It is free from the deleterious acid by which common coal gas affects *the atmosphere so much*, so rapidly corrodes gilding and painting, and proves prejudicial to the health of those who breathe the air impregnated and vitiated by it. It gives superiority of light both as to intensity and freedom from colour, being three times the power of ordinary gas; and this not by rough estimation, but by the most accurate test. Singular it is, too, that the heat is almost inversely as the light —that is to say, while there is three times the amount of light, there is scarcely more than one-third the amount of heat. The gas can be manufactured from oil, fat, or coal, at a very considerable saving as compared with common gas, so that while one burner will supply the place of three, or be reduced in size so as to consume only one-third the amount of gas, if giving the same amount of light, the economy becomes very great, while the advantages in a sanatory point of view are of themselves sufficient to give it precedence of common gas. The 'grand light' as distinguished from the 'domestic' is effected by means of two improved gases, united only at the instant of lighting, and further aided by the application of lime at the moment of combustion. The intensity of this is identical with the electric light, and further aided by reflectors is about to be extensively used for lighthouses and similar purposes. As a substitution for the common coal-gas, the domestic light, as witnessed at the Assembly-rooms, certainly justifies all the notoriety it has won for itself in scientific circles, and there appears to be every prospect of it being at no distant day in common use, and supplied by gas companies generally instead of the present deleterious gas. The effect of the grand light projected by means of a reflector is almost incredible; a watch or newspaper may be read at the distance of half-a-mile, while the light itself is so perfect as to render the nicest shades of colours as discernible as by the open day. The exhibition of the light brought together a larger assembly and public gathering than Bournemouth ever before produced, and some expectation is raised that Bournemouth may be the first town to apply this powerful light to ordinary domestic purposes and street lighting. The gratification of the inhabitants generally, and the very large numbers who 'turned out' to witness the light, was an expressive vote of thanks to the Hon. Major for the favour thus shown them."

I was not able to attend the major's lecture, to which the public were invited, but I can state from my own observation that the light is most intense. The grand light is the same gas as the domestic, aided by a jet of oxygen playing on a cylinder of lime about 2 inches long, and 1 inch in diameter, placed in front of a concave reflector about 18 inches in diameter; the distance at which a letter can be read is incredible. The light makes colours very vivid, considerably more so than daylight; I never saw so magnificent a green as the trees appeared when the light was thrown on them. The domestic light is the light for lighting streets, &c., as the grand light is too partial, and where you are out of the line of light, you are in the dark and there is no mistake about it. It is quite possible to pack the grand light in a portmanteau; the domestic is the size of a moderator lamp.

ARTHUR W. BLACKLOCK.

Bournemouth, May 9th, 1859.

THE RASPBERRY SYRUP PROCESS.

SIR,—In reply to your correspondent, J. C. S., who wishes to know how I made the raspberry syrup process answer, I can only say, that I implicitly followed the directions given in the "PHOTOGRAPHIC NEWS" of the 19th November last, using, at that time, a double combination portrait lens with half-inch stop, on a very bright day, in 35 seconds, for copying the engraving, and gave a few seconds more for a landscape. Since that time I have found that the *same* syrup bath has very much deteriorated, and the exposure required amounts to more than four times its length. I have therefore made a new syrup bath; and the two enclosed positive prints are from negatives taken last week with a caloscopic lens, 15½ in. focus, in 3½ minutes.

It appears to me, that the syrup requires to be new, and perfectly free from all acidity which might arise from fermentation or otherwise; as, although I kept a piece of camphor in it, it appears gradually to lose its preservative power. M. P. M.

PHOTOGRAPHIC NOTES.

SIR,—Have any of your readers tried to increase the sensitiveness of waxed paper by the use of chloride of ammonium, as a wash (say 5 grains to the ounce of water and sugar of milk) before or after the silver solution has been used? Mr. Raven's process answers very well, but the exposure required is long. The paper waxed by Sisson's process, with one-half of the castor oil he uses mixed with

the wax and turpentine, enables paper to be very easily and evenly waxed.

Would MM. Desprets or Foucault have had the sensations of a sun stroke from Bunsen's pile if their faces had been protected by a yellow covering?—"PHOTOGRAPHIC NEWS," p. 93. T. F.

MODIFICATION OF THE FOTHERGILL PROCESS.

SIR,—Through an error of mine, my letter on the above, at p. 88, is left incomplete, by the omission of the words "of prepared albumen."

The part referred to should stand thus—"which is simply the substitution of thin mucilage * * * * *for prepared albumen.*" Your insertion of this will oblige, as I find many of your readers are, as might be expected, at a loss to understand what the mucilage is substituted for.

As I have inquiries respecting it, I may also here add, that the plates require washing equally well when mucilage, as when albumen is used. ALFRED KEENE.

ANSWERS TO MINOR QUERIES.

INSTRUMENT FOR COUNTING SECONDS.—*Camera.* One of the simplest contrivances for counting seconds, is to be made by hanging a bullet at the end of a thread, 39 inches long, and setting this to swing as a pendulum; it will keep oscillating for upwards of a minute, and will be found very useful if kept permanently hanging in a convenient part of the glass room. If the silken thread, with the two bullets attached to it, recommended for levelling the camera in our last number, be made 39 inches long instead of 3 feet, it may also be made available for this purpose, by suspending one of the bullets by means of a small hook, and letting the other hang down freely.

DEVELOPMENT OF CALOTYPE NEGATIVES.—*O. A.* An American gentleman, Mr. Hazel, has found, that the admixture of one-half of gum water, with the gallic acid solution used for developing calotype negatives, much improves the resulting picture, as it prevents the image from appearing so sunk in the pores of the paper. Possibly this addition will be found to remove the woolliness of which our correspondent complains.

SENSITIVENESS OF CHLORIDE OF SILVER.—*A Young Chemist.* When it is said that chloride of silver is sensitive to light, it is always understood that the chloride spoken of has been prepared in the *wet* way, *i. e.*, by precipitation from a solution. Dr. Percy, one of our most eminent English chemists, has placed it on record that chloride of silver, prepared by the direct union of chlorine gas and silver leaf, underwent no darkening whatever, even when fully exposed to sunlight; and a specimen had been kept, for some months, fully exposed to light *in common air*, and yet no darkening whatever took place. The same high authority has also stated another curious fact. A little chloride of silver was placed in a small glass tube; chlorine gas was then introduced, and the tube closed. When the instrument was exposed to the light, a certain degree of darkening took place within a given time; and, when removed into the dark, the chloride of silver assumed its original whiteness, and, at the same time, its sensitiveness to light. If we are correct in supposing that the chloride of silver used in this second experiment was prepared in the wet way, this would point to a very radical difference in the molecular constitution of these differently prepared chlorides; for, whereas chloride of silver, prepared by the direct combination of its elements, refused to darken in the sunshine in the ordinary atmosphere, chloride of silver, prepared by double decomposition in the wet way, darkened even in an atmosphere of chlorine.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

A. C. S.—The cause of the red and green marks which appear on your pictures after varnishing, depends upon the varnish leaving too thin a film. Some varnishes are very liable to produce these iridescent marks; but they can generally be avoided by not pouring the varnish off so rapidly, and thus leaving a thicker film on the plate. You will not find these colours interfere with the ordinary process of colouring the picture, either with powder colours or otherwise, as the iridescence is too delicate to show through any colours which may be applied over the varnish.

ANTWERPIA.—1. We know of no other method of giving transparency to calotype negatives, besides the ordinary plan of waxing them. 2. The cause of the minute brown spots which appear on your paper negatives is, the nitrate of silver coming off the surface of the positive paper, and adhering to the surface of the negative. They may be avoided by having the positive paper quite dry, and just before using it gently rubbing the surface with a soft and clean cambric handkerchief.

J. HEDDMANS, JUNR.—Your picture is an excellent one; and we shall be happy to insert your name on our next list. We are pleased to hear you have been so successful with the Fothergill process.

NORWOOD.—There must be something radically wrong with your chemicals, as your exposure is at least ten times the usual time; but as you give no details respecting the way the solutions work, we cannot advise you how to remedy the fault. Use a nearly neutral bath, and add to it a few grains of acetate of soda.

F. A. BORRELL.—See answer to Mr. Jackson in our last number.

D. STORRAR, JUNR.—Received.

AN UNFORTUNATE TYRO.—The blueness of your glass positives may arise from the collodion being too thin, or the exposure being insufficient. Try the effect of adding a few drops of the nitrate of silver bath to the developing solution before pouring it on the plate; and do not work with a bath more than faintly acid with acetic acid.

BILLEY.—An imperial gallon of water weighs exactly 10 avoirdupoise pounds, or 70,000 grains, when the barometer stands at 30 inches, and the thermometer at 62° Fahrenheit. From these data, you can easily calculate the weight of any fraction of a gallon.

INQUIRER.—We do not know the address of the "Metropolitan Water Glass Company," or we would inform you. We should be glad to hear in what way you propose to render "Water Glass" serviceable to photographers. It possesses many valuable properties, and we think that a few experiments on the subject would be well rewarded, as there are few substances better adapted for the production of a hard and durable glaze.

PHOTO-FOTHERGILL.—After long using the second bath will increase so much in strength as to render dilution necessary. The amount of silver present in it should therefore be tested from time to time by the process of argentometry, which we gave in our first volume.

T. G.—1. A whitewashed background is very bad; you will never succeed in taking as good pictures with it as you would with one of a darker colour. 2. Employ the cyanide in a more dilute state, and wash the pictures well after fixing. 3. Expose the bath to the sun for a few hours; then filter, and acetify if necessary.

C. S. K.—We cannot understand your description sufficiently to give you much assistance. You must push in or draw out the ground glass, until the image appears most distinct.

F. L. G.—Received with thanks.

B. PIERCE.—The bath and other solutions should be prepared exactly as Mr. Keene recommends. Fix with 4 ounces of hypo. to 12 or 16 ounces of water.

A. G. G.—1. According to Mr. Lyte's experiments, a nitrate of copper bath would be injurious to silver prints. 2. It is best to tone before fixing. 3. Marion's paper is preferred by many. 4. Each paper process possesses special qualities, which recommend themselves to different persons; we therefore cannot say which is the best. 5. Use bromide of cadmium. 6. Ammonia does not fix prints so perfectly as hypo. 7, 8, and 9. We cannot speak from experience on either of these points.

J. H. B.—Add about one tenth of a grain of bromide of cadmium to each ounce of collodion; this will remedy the solarisation of which you complain.

J. H.—We think the lens you have called No. 2, is decidedly the best of the two.

V.—Received with thanks.

J. P. P.—We can suggest no better remedy than adding a few drops of nitric acid to your developing solution; and if that does not prove an effectual remedy, to the bath.

J. W. W.—1. We prefer a twin lens camera mounted on parallel laths. 2. We will insert the query. 3. We would rather not interfere in the matter beyond inserting the names and addresses.

F. A. W.—We cannot help you. You got into the difficulty with your eyes open, and in direct opposition to our express advice; and you must now get out again as best you can.

HYPOSULPH.—Add one drachm of absolute alcohol to each ounce of your collodion.

CHIRURGUS.—If you place a piece of camphor the size of a pea into the filtered albumen, it will keep good for some months.

DILEMMA.—The gradual accumulation of acetate of soda in your bath has thrown it out of order. You will not succeed satisfactorily now, unless you make a new bath.

R. GORDON.—The discoloration is owing to the print not having been sufficiently exposed to the action of the hypo. or the toning bath. The margin of the print has been soaked sufficiently, but the centre, where the spottiness is, has been, probably, protected from the proper action of the liquid by contact with another print, or by being partially elevated above the surface of the solution by an air-bubble underneath.

P. S.—1. Free exposure to warm dry air is the only means of getting rid of the smell of a newly varnished box. If the wood is sufficiently well seasoned, placing it in a rather cool oven for a few hours may prove of use. 2. Carbonate of soda is better than ammonia for neutralising an acid toning bath. 3. An ordinary ¼-plate lens will answer very well for a magic lantern. Place it in the same position as the other lenses were, and at a distance from the slide a trifle longer than its focal length; and, finally, adjust it by trial.

IGNORAMUS.—To answer such very elementary questions in sufficient detail to be of service, would occupy far more space than we can spare. You had better consult some elementary work on photography.

ONE PERPLEXED.—No such process has yet been brought to sufficient perfection to be of practical use. Try one of the well-established dry processes.

T. T. H.—Your letter has been forwarded to the proper address.

Communications declined with thanks:—D. G. P.—T. T.—Forth.—A. S. F.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—F. C.—T. N. L.—An Amateur.—T. H. E.—X. T. R.—Tyro.

IN TYPE:—T. A. Malone.—C. Heisch.—Evergreen.—A Kerry Man.—Vistor.—T. Millard.—J. W. W.—W. A. Young.—H. S. L.—J. B.—W. W. Hughes.—N. T. A.—H. E. Jennings, junr.

ERRATUM.—In vol. ii. p. 98, the formula for the fixing solution should be, "cyanide of potassium, 12 ounces; water, 2 quarts."

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 37.—*May* 20, 1859.

THE PRESENCE OF OXALIC ACID IN COLLODION.

THOSE who took the trouble to read our report of the discussion at the Photographic Society, which we gave in our last number but one, p. 104, could not fail to be struck with the remarkable fact, announced by Mr. John Williams, of Cavendish Street, viz., that from twenty Winchester quarts of collodion residues he had obtained sufficient oxalic acid to yield no less than 1 pound 5 ounces of oxalate of lime. In conversation afterwards we found that this was regarded as quite a new fact; and as it was generally allowed to be of the greatest interest, we think that the following account of some experiments by M. De la Haye, bearing on this subject, which were communicated by him to a foreign contemporary some time ago, will prove interesting to our readers. He first directs a collodion to be made of 100 parts of pure ether, sp. gr. ·847, and 4 parts of well-made gun-cotton. (It is a pity that the author does not enter into more detail on the manufacture of this gun-cotton, as on this, we think, the whole question turns.) The mixture is placed in a conical vessel to facilitate precipitation, and well shaken during the first few days, after which it must be allowed to remain at rest for about three weeks. At the end of this time three distinct strata of the liquid will be apparent, each differing in density. The uppermost is composed of a perfect solution of pyroxyline, having the colour and consistence of very white albumen. The next layer is thick, and contains pyroxyline only partially dissolved. The lowest and densest layer consists of a small portion of dissolved pyroxyline, a large quantity of unchanged cotton, and impurities. This layer has not the properties necessary for photographic collodion; it contains several salts, held in suspension by the more or less azotised fibres, or supplied by the re-action of the ether.

The two upper portions of fluid must be poured off carefully, and one per cent. more pyroxyline added, when a rather curious phenomenon presents itself. The ether, finding new gun-cotton to dissolve, abandons the fibres it had only swelled and held in suspension; hence it results, that the precipitate of this second operation is proportionally greater than that of the first, and slightly different in its nature, being more dense and felt-like. It is probable that among these fibres a portion may be changing to oxalic acid, or, at all events, have commenced this transformation. It is certain, however, that under the influence of various circumstances, *the deposits of old collodion, when greatly concentrated, and treated with potassa, yield perfectly defined crystals of oxalate potassa.*

After standing fifteen days the fluid must be decanted, and mixed with an equal quantity of distilled water to wash the collodion. The mixture must be long and well shaken, and then left to subside for a month or six weeks. Two layers are formed, and a singular fact presents itself—the collodion is thicker than before. This may be due to the absorption of 1 part of ether by 10 of water, or to a certain combination of the two bodies; there is the fact, and the first hypothesis is the simplest explanation of it, though it does not quite account for the increase of density being considerably more than one tenth. (This would be accounted for, by taking into consideration the absorption of water by the ether.) A second phenomenon is also worthy of notice, the layer of water is acid, while the collodion is absolutely neutral; the water evidently deprives the collodion of its soluble salts, and carries all the remaining impurities to the bottom. The washing gives to the ether perfect neutrality, and relieves it of the acetic and nitric acid, &c., which it may contain, and imparts to it new properties.

Collodion prepared in this manner, if allowed to stand for six months, acquires a perfect limpidity, and forms no deposit. Age perfects it. It would seem as if the pure elements of which it is composed united together more intimately.

This collodion, it will be remarked, contains no alcohol, which accounts for its great tenacity on glass, and, also, for its non-destructive action on the silver bath, which, once saturated with the small portion of ether which water can absorb, retains no more. It is quite otherwise with collodion charged with alcohol, which, at each immersion, adds something new to the bath; so that after a number of collodionised plates are immersed, the alcohol reacting, and, perhaps, decomposing under the influence of the chemical transformation effected by its presence, causes the bath to excite the plate with difficulty, and acquires a great tendency to produce foggy pictures on development.

Old silver baths give rise to a peculiar needle-like crystallisation on the layer of collodion—a compound precisely analogous to oxalate of silver; and, on analysing the bath, more or less abundant traces of oxalic acid are found. Oxalate of silver is a salt sensitive to light, and very much more sensitive in the presence of an excess of nitrate of silver; its presence therefore, as a reducible salt in the nitrate bath, is to be feared, inasmuch as it is more than probable that it is to its mixture with the iodide of silver that the veil is owing, which, in such cases, covers part or all of the pictures.

PHOTOGRAPHY IN THE CAMP.

IT appears that several months since photographic apparatus was sent to the Artillery in garrison, at Versailles, with proper persons to give instruction in the art. Laboratories were established, and good progress made by the military students in its practice, some of the prints they turned out being very creditable specimens of photography. The scene of their labours is now transferred to the plains of Italy, the Emperor being desirous of possessing pictures of those fields of action in which he so confidently expects to be victorious. There is thus a possibility that they may accomplish, on a more extended scale, that which our correspondent in Algeria has done on a lesser, and give to the world representations of a field of battle as it actually appears during an action.

We have also received a letter informing us that experiments had been made, within the last few days, by some officers at Grenoble, with the view of testing the practicability of a suggestion put forth by us, and translated into the foreign papers, relative to the employment of micro-photography in transmitting despatches from one part of an army to another, between which the communication is excessively dangerous or absolutely impossible. In the experiments alluded to, an imaginary despatch, containing fifty-two words, was written on a strip of thin paper in very small letters, and as closely as possible; this piece of paper was then rolled up tightly, and deposited in a conical ball, which had been hollowed at the core to the required depth. The open end was stopped up with wax, and the ball forced down into

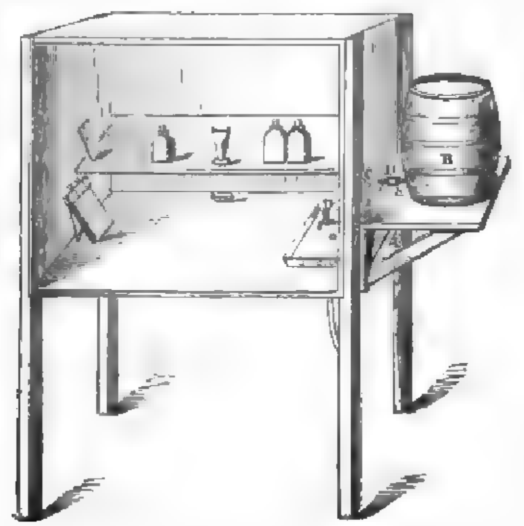
a rifle in the ordinary manner. Some thick planks were then reared on end, in the road which ascends the hill on which the fortress is built, and the bullet was fired into them from a distance of 150 mêtres, after which it was cut out and examined, when it was found that though the wax had been forced against the outer edge of the despatch in such a way as to glue the edges together, yet this was readily removed with a penknife, and the despatch itself was uninjured. This method of writing the despatches, instead of employing micro-photography, is so far an improvement on our suggestion, that it can be adopted under all circumstances, whatever the state of the weather may be.

A SIMPLE DARK ROOM FOR WORK NEAR HOME.

MANY persons busy themselves with the construction of intricate and expensive *dark rooms* for out-door work on their own premises, when a far cheaper substitute can be provided with little trouble.

I have myself adopted a very simple plan (I say *adopted*, for, though I have never seen a similar contrivance, many, no doubt, have ere this carried out the same or a like design); and my plan has the advantage of being sufficiently practicable for use in the house or garden. I construct my "dark room" as follows:—

Procure a box about three or four feet square (never mind how roughly made, so that the panels fit *closely*)—a large tea chest would answer admirably—cut out at the back or left side the space for a window, six inches by four, and glaze with deep yellow or orange glass, and stop up all cracks in the top, bottom, and sides of the box with putty or marine glue. (If for out-door work the waterproof properties of the latter render it more desirable.) Next either attach legs to the box by nailing them to the side, or provide a stand or bench, and, if thought necessary, give the embryo room a coat of paint. It would be well, under any circumstances, to paint or stain the interior black.



A shelf at the back of the box, should be added, as extremely useful for holding collodion and solution bottles, &c. A gutta percha sink should be placed on the right hand side of the box, the waste-pipe of which, passing through the bottom to the ground, may be made of gutta percha or India rubber tubing, though should the dark room have *fixed* legs, a metal pipe passing down one of those legs would be preferable, as less likely by its firm position to splash the clothes or be injured.

A dark curtain to exclude the light when operating should next be made, and had better be constructed of black glazed calico, lined with yellow, and so broad that when fastened to the top and sides of the box (*not the legs*) it will allow the operator to gain access to and leave the interior of the "room" without admitting light. It would be well to nail a piece of black or yellow calico down the front legs of the "room" to guard against the possibility of light entering from the rear.

The dark room is now complete, and all that remains is to introduce the bath, &c.

One hint more may be acceptable, and that is, how to obtain a good and convenient supply of water.

My suggestion is as follows:—In the first place, the water can be supplied from the sides or top.

If the "room" has fixed legs I recommend a supply from the side. The sink being placed to the right of the room, about two-thirds of the way up the outer "right" side of the box fix a bracket A, and on it place a small barrel B; in lieu of a tap fix a piece of metal tubing E, extending one inch from the barrel—a pipe C should be fastened to the interior of the room, also on the right side, so contrived that a tap D attached to the lower end shall drain into the sink and be nine inches or a foot above it. The upper end of the pipe must pass through the side of the box, just above the bracket, and project an inch, and can be connected with the branch-pipe by means of a piece of India rubber tubing. Fill the barrel with water, and a good supply will be at the photographer's disposal.

With these directions there will be no need to explain the mode of obtaining water from the roof. EVARGRAH.

PHOTOGRAPHY APPLIED TO TOPOGRAPHY.

M. CHEVALLIER, an assistant surgeon attached to the hospital of Gros Caillon, has submitted to the judgment of the *Société d'Encouragement* a new apparatus, which he calls a photographic plane-table, which enables any photographer to take, with great rapidity, all the altitudes, and to perform all the graphic operations necessary to the complete determination of the topography of a country, without any knowledge of the subject. As this apparatus is one which offers great practical advantages, the commission appointed to examine it went into the matter with great zeal and assiduity, and with a commendable desire to make their report as speedily as possible, choosing for their mouth-piece an eminently competent man, M. Benott, the learned author of the "*Traité de la règle à calcul.*" His decision is entirely favourable; and, to give a perfect idea of the photographic plane-table, we cannot do better than reprint the essential part of the report:—"The photographic plane-table is composed of a solid tripod of an ordinary plane-table, around the axis of which a camera can revolve, the construction of which has been modified by M. Chevallier, and the object-glass of which can be pointed successively to all the visible points of the horizon.

"The glass plate, coated with collodion or sensitised albumen, is circular, and received in a concentric frame of a similar form, the periphery of which is furnished with teeth, after the manner of worm wheels. This frame and the glass plate can also revolve around their common axis, which passes above the daguerreotype picture in such a way that the latter projects itself entirely on the inferior part of the plate, and can be there limited laterally by two systems of shutters; either by two vertical ones, brought as near together as desired, or by two uprights, uniting at the centre of the plate, and inclosing as sharp an angle as may be considered advisable.

"It follows from these arrangements, that without taking out the plate from the interior of the modified camera, that by merely making it move round its axis sufficiently for a fresh image to project itself beside those already received, one may, by directing the object-glass towards all the points of the horizon in succession, obtain as many partial pictures, the whole of which, together, will constitute a sort of panorama of the locality.

"This *ensemble* is not a real panoramic picture, such as one obtains with the modified apparatus of M. Garella, for example; but no doubt it has already been divined that it is eminently fitted to resolve the topographical problem which M. Chevallier propounded to himself. Indeed, what more is required for this *ensemble*, while showing the aspect of the different signals serving as vertices to the triangles of the chain of the map to be taken, visible from the station occupied by the photographic plane-table, than to give, at the same time, the graphic horizontal projection of the angles embraced by the direction of these signals? It will, evidently, suffice, that the image of the verticals of these latter are traced in the partial views of which they form part, and that these images, which will cross, by construction, at the very centre of the plate, include between them angles equal to the corresponding azimuths, measured at the station; and it is precisely such a graphic tracery which is immediately obtained by M. Chevallier with the photographic plane-table, by extremely simple arrangements very ingeniously added to those already pointed out.

"1. *The image of the vertical of the observed signal* is furnished by the interposition of a fine horsehair, stretched vertically between the plate and the object-glass, and passing by the axis of this latter, and by the axis of rotation of the plate, because the plane that these axes and the hair determine, passes by the vertical of the signal.

"2. *The azimuthal angles* are reproduced with the aid of an indented circle, forming the plate of the tripod of the instrument, and of a communication of movement between this toothed circle, rendered fixed in space, and that of the frame of the plate.

"This communication is composed of two small shafts, crossing each other at right angles, working together by two small angular wheels, each furnished with a cylindrical-toothed pinion, that of the horizontal shaft with the vertical frame of the plate, and that of the vertical shaft with the fixed horizontal-toothed circle of the tripod. These workings in each other being combined in such a way that the plate makes one entire revolution around its axis in exactly the same time as the body of the apparatus occupies in making the tour of the horizon, it is evident that for the passage of the optical axis of the object glass from the vertical of one of the signals to that of another, this axis describes an angle equal to that comprised between the two vertical planes passing by these signals—an angle that the mechanical arrangements adopted by M. Chevallier will make the plate describe exactly, and embrace, without the possibility of error, by the images of the verticals of these signals, if the transmission of movement is made without loss of time.

"Thus the problem of the photographic tracing of the elements of the outlines of a topographical map, such as they are obtained with the ordinary plane-table, is ingeniously resolved, and without risk of error, because M. Chevallier's instrument supplies the means of assuring oneself, before receiving the daguerreotypic picture, that the vertical plane of the axis of rotation of the plate, of the optical axis, and of the horsehair, really passes by the vertex of a proposed signal. This essential condition is obtained by directing towards the signal a plongenute telescope fixed outside, of which the particular optical axis is movable in the plane of the hair, of the axis of rotation of the plate, and of the optical axis of the instrument.

"It is evident that the negative daguerreotype picture being obtained, as many proofs may be taken from it as are required, which will allow of their being placed at the disposition of different operators simultaneously.

"With the object of protecting his invention against so-called improvements, which are in reality nothing of the kind, M. Chevallier has combined his photographic instrument with the essential parts—limb and sliding-gauge—of a theodolite or double graphometer, with the assistance of which one may read the numerical amplitude of the azimuthal angles, as well as those of the angles included between the images of the verticals of the signals on the plates. A compass there gives the magnetic orientation of these angles, because by bringing the optical axis in the plane of the magnetic meridian the image of the hair will represent the trace of this plane on the horizon. Therefore, this instrument, such as it is made and presented to the Society, enables the observer to operate either trigonometrically or photographically, and, in all cases, the two methods of operation ought to lead to identical results, and mutually verify each other.

"Besides the topographical applications, M. Chevallier's instrument can easily furnish not only the different points of view discoverable from the station it occupies, but likewise the divers episodes, almost simultaneous, of a general action going on around, whatever may be their nature. To accomplish this, it is only necessary to utilise the exterior vertical limb visible behind the circular glass plate, around the axis of which turns an index connected with the frame of this plate. This index serves to indicate, by means of pins introduced and left in the open holes on its edges, the utilised sectors of the plate, and consequently those of its parts which have remained disposable, and entirely prevents the superposition of images."

The committee expressed a hope that the Society would share its satisfaction, and that it would encourage the inventor for his addition of another to the already long list of uses to which photography is applicable. The Society adopted the report, and gave its approbation to the photographic plane-table.

THE PRESENT STATE OF PHOTOGRAPHY.

UNDER the above title, in the *National Review* for the month of April, there is an admirably written article, evidently the production of one who thoroughly understands the subject, and who is perfectly acquainted with all the steps which have been taken in the development of photography. So highly does the writer think of the art, that he considers the two most startling productions of the exciting age in which we live, photography and electric telegraphy. So much so, that they "are naturally selected by the popular mind as representing, in an emphatic and characteristic manner, the rapid growth of a stupendous offspring from a seed of human knowledge so small that our fathers remember the day when it was hardly visible." The accounts given of the early attempts of discoverers is clearly and graphically sketched. He says:—

"We have few data for judging of the train of thought that led Nicéphore Nièpce to work through many years at the problem of producing a picture by the sunlight, and which induced him to put a firm faith in the conviction that such an end was achievable. Others certainly had gone before; but unsuccessful attempts on the part of others are rather deterring than inspiriting in their influence on the mind of the man who would venture in the trodden path; so that the results of Wedgewood and Davy, which failed, because they could by no then known means be rendered permanent, may have deterred M. Nièpce from the course so successfully followed, and subsequently, by Mr. Talbot, with the compounds of silver; while the less conclusive failure of Wollaston to make gum guiacum a photographic agent, may, by proving, at least, the decided chemical change effected by the violet and blue light on that substance, have prepared the mind of M. Nièpce for a resolute effort to make gum resins a means to that great end, in the attainability of which he evidently believed. We may thus understand his elaborating the first practical and successful process of 'heliography.' He formed his picture on the bituminiferous substance called asphalt, or bitumen of Judea (Jews' pitch), a body consisting of at least three, and probably many more, substances of a resinous nature, and most likely very variable in its chemical characters. . . . .
. . . . This substance was found by M. Nièpce to be so changed by the light, as to be thereby rendered insoluble in substances that were capable of acting as solvents of it before it had been exposed to the luminous agency. This action

of the light on many of these resinous substances consists, in fact, in a conversion of them into a new form of resin, more compact, more solid, and less soluble in certain essential and other oils, than they are in their pristine state. M. Niépce discovered this fact; and after powdering the Dead Sea asphalt, and exhausting it of all its unchanged (and therefore soluble) portion by oil of lavender, he next spread this solution (in comparative darkness, of course), on a polished plate of silver, and drove off the solvent oil by heat. The silver plate, thus coated with the soluble part of the asphalt, was either exposed in the camera obscura for a lengthened time, or some leaf or other object was superimposed on it, and the light left to do its work wherever, and with a result in exact proportion to the intensity with which its rays fell on the plate. After the action of the light was carried as far as was requisite, the plate was again removed to a dark room, and treated with a mixture of the oil of lavender and natural petroleum, or rock oil—a liquid of very complex and mixed composition that exudes from the soil of many regions. This mixture dissolved the asphalt that had been unaltered by the light, leaving the altered portion upon the plate in quantity proportional to the intensity with which the light had operated. A picture remained, therefore, upon the silver surface, represented by the asphalt in all the lighter portions of the original, whether an object in the camera, or a superimposed print, or any other thing that intercepted the light.

"The first real result in a great discovery is always worth detailing, even though rendered obsolete by the march of events. The heliograph we have described was the first permanent photographic picture ever produced, and it belonged to M. Nicéphore Niépce to attain it. Its date was about the year 1826."

Before alluding to the poetic account of Mr. Talbot's motive in attempting to discover a means whereby he should make nature paint herself, we may notice the extraordinary series of coincidences which seem to constitute the history of photography. Those coincidences which occurred in its early days, when scientific gentlemen, without any preconcert, were bent on discovering the very same thing, need only be mentioned, as they are too well known to our readers to need recapitulation. But they certainly are novel in the regularity with which we find French and English inventors, after years of patient toil and study, reaching similar results at nearly simultaneous periods. The account of the motive which prompted Mr. Fox Talbot to set about making nature paint herself is something unique in scientific research. According to the writer:—

"It was on that beautiful Italian water, whose triple arms converge on the point of Bellagio, that Mr. Talbot longed for a power to enable him to bear away an image of Lecco and Como. There he resolved to work out the problem by which nature herself should be induced to perpetuate the outline of her own beauties in an artistic form. The earlier steps of his progress have never been told; but, in 1839, there was an announcement made to the world of the birth of a new art, practically available for this purpose. It was made simultaneously, though in different processes, in Paris and London; in Paris by M. Daguerre, in the form of the daguerreotype; in London by Mr. Fox Talbot, in the shape of a 'photogenic process,' for copying leaves, prints, &c."

The writer then proceeds to notice the various steps which were taken to improve the ingredients used by the manipulator so as to enable him to produce better results. For the benefit of our non-photographic readers we extract the following passage as containing an account of all the steps taken by the operator in order to obtain a photographic picture. It is so free from technicalities that anybody can fully understand the "process":—

"We will follow the manipulator into his dark chamber. The small amount of light allowed by his jealous care to penetrate that room of mysteries, is admitted only through yellow glass, and thereby filtered of those blue and violet, as well as invisible, rays, which are the energetic agents in the photographic result. Here we enter; and, if the experiment has been a successful one, ere we go out we shall be witnesses to a stroke of magic that might have made the teeth of a Cagliostro chatter. From out of his dark slide the photographist takes a square of glass. On its surface is spread that transparent film—infinitely delicate, for a touch will tatter it—on which so much careful skill has been brought to bear. It has just been exposed in the camera; in other words, for a few rapid seconds that delicate film has been placed where the image of some natural object—perhaps some pretty country scene—has been projected by a lens upon a focused plane. That fairy miniature, formed by the well-adjusted convergences of the refracted pencils of light, is a thing so beautiful, so unspeakably lovely, that none can, for the first time, look on the ground glass of a camera, focussed to a beautiful scene, without carrying away a new feeling, and a new delight. That lovely little picture is but a fantasy. Though every varied tint and every waving form be seen there as the eye sees it in nature—even, perhaps, more intense in its brilliancy, from its being more minute and concentrated, so to speak, in its scale—yet remove the glass screen on which the image falls, and it is gone, unsubstantial as a dream, and with something of a lovely dream's fascination. But let the glass screen be replaced by the sensitive collodion film, and some at least of the imagery of that otherwise transient picture may be rescued from oblivion. Was not the man a poet to whose mind this thought came on the Lake of Como? Was it not something of the creative faculty of the true ποιητής, that gave that thought its first triumphant realisation? We look then on the filmed surface of the glass that has for those two or three seconds been the retina, as it were, on which that image in the camera was projected; but it reveals only a blank. The most careful scrutiny will reveal no changes in it. But no time must be lost, or the surface will be too dry to receive the next process, by which the photographist sweeps rapidly over the glass plate a wave of a susceptible liquid. It is a mixture of a little acetic acid, a very little nitrate of silver, and a solution of a remarkable substance formed by the distillation of gallic acid (pyrogallic acid). Look on the glass plate—a moment's pause—it is but a moment; for now, revealed with magic suddenness, and growing rapidly, with increasing loveliness, each moment brighter, clearer, sharper, there is the picture. But the sky is black; and athwart it, with infinite ramifications of living and gnarled branch, each point tipped with the young bursting leaf buds (for it is full spring tide), stands out, in a weird contrast, that oak tree in the foreground, white against the dark, midnight looking sky; yet not entirely white; for a closer view, as the magic growth is fulfilling itself, reveals a thousand pencillings of delicate lines and inexplicable shadows, giving roundness, sharpness, life, to every organic twist of the old tree. Underneath and round it, from the black stone in the foreground, in relief on the white grass, to the tiny fairy cottage under the hill, beside the far drawn perspective of that dark-watered streamlet, a black cottage, with its white window lattices, is spread a scene, not indeed the same we saw but now on the screen of the camera—and yet how like it! The outline is the same. That old oak is a familiar friend loved by our grandsires, and one cannot fail to recognise its well known form. Under the hill stands, indeed, a cottage, and its little roadway fords the streamlet; but it is, in reality, a *white* cottage, with its brightly gleaming windows barred by dark lattices—a little cottage home of England. Why is that gleaming river a dark line, and not a delicate white thread of gleaming rapids? One word explains the spell. It is a negative picture. Those strange underlights in the oak boughs are thrown by no level sun setting on the horizon. Those shadows are not flung athwart some 'land lit by a large low moon.' Those weird *lights* are natural *shadows*; and those inexplicable shades are the lights of the natural picture: but the lights have left a darkening impress on the sensitive surface, and the shadows of nature are left as lights on the photograph, because there the plate was less illuminated when they fell. The picture is complete, and the practised eye of the operator sees the moment to be come when further development would be prejudicial, and the action must be stopped. He washes it carefully, but thoroughly, with water; and the picture, as now looked at, is composed of 'lights' in nature, represented by the *dark* silver deposit, and 'shadows,' represented by the primrose-*yellow* iodide of silver, still remaining on those parts of the film where the light was comparatively inactive. By the yellow light the tint of the iodide is undistinguishable from white, and its comparative opacity gives a 'body' to the picture. It only remains now to fix the image."

Speaking of the application of photography to the reproduction of works of art, the author says :—

"But perhaps the most valuable application of photography is one in which it has already been very successfully employed —the reproduction, namely, of facsimile drawings after Raphael, and the other great artists, whose genius could write a poem in a line, and convey the expression of a human heart in a symbol little other than a doll, yet embodying the thousand-fold cares, sorrows, and affections of a human eye. Here the photograph is an unrivalled, an unapproachable, transcriber. Photography will doubtless be also continually more employed in perpetuating and disseminating engraved works, such as those of Marc Antonio; while, as an unerring copyist of the records of other times, in other lands—in giving to a Rawlinson the materials for his researches, in the form of exact copies of inscriptions on the great monuments of Assyria or Egypt—it has done much, and will do more, good service."

The writer divides the present state of investigation which is going on in the photographic world into three heads:—

"1. Methods of rendering the sensitive plates portable, so that they need not be used the moment they are prepared, *i.e.*, preservative processes.

"2. Methods of producing actual engravings or printing blocks, from which prints can be taken, *i.e.*, phototypic and photoglyphic methods.

"3. Some of the applications, whether useful, artistic, or only curious, to which photography has been applied."

We are glad to find that the writer speaks so favourably of Mr. Hardwich's *Chemistry*, while the remarks he makes upon the *Journal of the Photographic Society* are, although true, anything but complimentary. The writer seems to consider it the tomb of the undigested results of the efforts of inventors. As to the three heads into which the author has divided the subject of photographic investigation we need not here allude to them, as they have been so fully treated of in these pages, especially the photoglyphic invention of Mr. Fox Talbot, which was *first* communicated to the public in "The Photographic News." To the subject of photography, in relation to art, which is here treated in a few paragraphs, we shall probably have occasion again to revert.

PRINTING UNDER DIFFICULTIES.

By an article of the French code, every possessor of a clandestine printing office is liable to a penalty of 10,000 francs, and imprisonment for six months. A short time ago a photographer was found to be in the practice of printing writings, in the following manner:—He took a glass plate, which he covered with an opaque varnish, on which he traced the words he desired to reproduce, by cutting down through the varnish to the glass plate with a sharp-pointed instrument. He then took a sheet of chemically prepared paper, and exposed it under the glass to the action of the light in the ordinary manner, the result being that the letters traced on the varnish were printed on the paper, which was then treated with a fixing agent, and the thing was complete.

The matter coming to the knowledge of the police, they made a descent upon his premises, and seized the things necessary to prove the facts given above; and the case came before the tribunal of Marseilles, which decided that it did not come under the article of the code referred to. Against this decision the public prosecutor appealed, and the affair was brought before the Imperial Court at Aix, which annulled the decision of the Marseilles tribunal, and inflicted the full penalty of fine and imprisonment allowed by the law. The unfortunate photographer now exercised his right of appeal. His counsel urged several objections against the conviction, the chief of which was that the article in question specified certain kinds of printing, namely, typography, lithography, and engraving; and was not intended to apply to a process which was neither of the three. The court, however, overruled these objections, and confirmed the conviction.

We give the above as an illustration of the pressure under which photographers exercise their profession in a country which is about to sacrifice, possibly, thousands of its sons in giving liberty to Italy; not because we deem this particular case one of peculiar hardship, or the prohibition to practise this kind of printing as of any importance; the slowness of the process would always be a bar to its use. But what would be the feeling of photographers in this country if they heard that one of their number had been taken to Bow-street, by order of Sir Richard Mayne, and sentenced to six months' imprisonment and a fine of £400, for having in his possession a negative capable of yielding a page of writing or print?

Critical Notices.

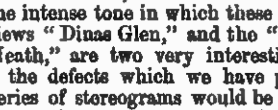
Stereograms of the Vale of Neath.

We have been shown a series of landscape stereograms, taken chiefly in the neighbourhood of Neath. In these days of extensive stereographic publication, we are accustomed to see such really excellent things that, when we come upon anything not up to the standard, we are inclined to look upon it as only mediocre. The views before us have many good points in them; but, in regard to the photographic department, they are scarcely up to the mark. They are too intense, and, as a consequence, there is, in many instances, scarcely any half-tone, and too little detail. The best view in the series is the "Old Flint Mill, Vale of Neath." The treatment of this subject is very clever, as the very things which cause defects in the other pictures add to the interest and beauty of this. The hard and flinty character of the soil, and the arid scenery, are greatly heightened by the intense tone in which these photographs are printed. The views "Dinas Glen," and the "Lower Cillufiste Fael, Vale of Neath," are two very interesting little bits of scenery; and, if the defects which we have pointed out were remedied, few series of stereograms would be found capable of affording more interesting employment for a leisure half hour.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

A handsome face is of an oval shape, both front view and in profile; in the latter it will be seen how gently the forehead and chin recede; how beautifully the top and back of the head are rounded, no one organ predominating to destroy its even line. The nose, slightly prominent in the centre, with small, well-rounded end, fine nostrils; small, full, projecting lips, the upper one short and curled upwards in centre, the lower one slightly hanging down in centre, both turned up a little at the corners, and receding inside, of a vermilion colour; chin round and small; very small, low cheek-bones, not perceptibly rising above the general rotundity. Eyes large, inclined upwards at the inner angles, as in the figure, downwards at outer angles; upper eyelids long, sloping beyond the white of the eye towards the temples.



Eyebrows arched, forehead round, smooth, and small; hair rather profuse, and dressed to follow the form of the head, as a beautiful face is disparaged by having the hair wrongly dressed. Of all things, do not draw the hair over the forehead if well formed; but, rather, up and away. See the Venus de Medicis, and, for comparison, see also Canova's Venus, in which latter the hair is too broad.

An intellectual head has the forehead and chin projecting, the high facial angle presenting nearly a straight line; bottom lip projecting a little, eyebrows rather near together and low (raised eyebrows indicate weakness). Broad forehead, overhanging eyelids, sometimes cutting across the iris to the pupil. For further information upon this subject, see Lavater, or some such author, on "Physiognomy."

Expression.—When people sit for photographs, they generally contract their eyes to avoid the glare of light. With the eyes, the whole face becomes contracted often, and a disagreeable expression results. To correct this in painting, as a general rule, the upper eyelids will require raising and widening; lower eyelids drooping; irises will require enlarging, eyebrows raising and opening (as they will probably be drawn together producing something like a frown), corners of mouth raising, centre of forehead making lighter; and the line down from the sides of nose towards corners of mouth softening. We have seen, in bad photographs of handsome young ladies, deep wrinkles about the eyes, the forehead, and corners of mouth, caused by this drawing up of the face in pain from the light.

Expression can be produced by light and shade without altering the form of lines; for instance, a darkness between the eyebrows in a head, would make it sad and thoughtful; at least, as to the expression on the forehead: then, to convert the whole face from happiness to sadness, it would only be necessary to introduce a darkness on the upper part of the cheek, immediately below the eyes, and below the corners of the mouth; because, if the muscles of the face were under the influence of joy, the light coming overhead, such parts as were raised catching the light, would be bright; whence it will easily appear that introducing shadows in these places, or deepening the bright lights too much, would not only destroy the intended expression, but, if carried to excess, produce quite an opposite one.

In these remarks, as also in those that follow, it is understood that the light comes from overhead, for if it came from below, all this would be just reversed.

Tints in Various Parts.—The colour of flesh, under ordinary circumstances, varies in different parts, although, to persons who view things superficially, it may appear only of one tint throughout; yet, if it were painted so, with only different degrees of shade, such a picture placed by the side of one wherein every delicate degree of pearly tint was introduced, the former would be found to suggest only a form of clay, without any of that suppleness or transparency peculiar to flesh, which suggests that blood runs beneath the skin.

Beyond a few leading points of light, it will be found that there are no two parts of a head alike; all is varied; the general tint is, as it were, refined through various conditions; from the warmth of light, through degrees of pearly tints, to the purply hue blending into the warm shadow. On the forehead the tints are more inclined in the centre to yellowness; on the outsides, temples, &c., to blue; sides of cheek-bones, &c. rather warm; indentations at corners of mouth, rather blue; in front of cheeks the tints are fresh and laky; chin warm; neck and bosom, bluish; the latter having its pearly tints visibly increasing to blue. The hands are generally of a pinkish colour inside and towards finger ends; wrists bluish.

(*To be continued.*)

Dictionary of Photography.

Chrysotype.—A photograpic process discovered by Sir J. F. W. Herschel. It is as follows:—The paper is washed in a solution of ammonio-citrate of iron, it must then be dried, and subsequently brushed over with a solution of ferrocyanide of potassium. This paper, when dried in a perfectly dark room, is ready for use in the same manner as if otherwise prepared, the image being impressed upon it either from nature in the camera obscura, or from an engraving in a frame in the sunshine. The image so impressed is, however, faint, and sometimes hardly perceptible. The moment it is removed from the frame or camera it must be washed over with a neutral solution of gold, of the strength of sherry. Instantly the picture appears, not indeed at once in its full intensity, but darkening with great rapidity up to a certain point, depending on the strength of the solutions used, &c. At this point, nothing can surpass the sharpness and perfection of detail of the resulting photograph. To arrest this process, and to fix the picture (so far, at least, as the agency of light is concerned), it is to be thrown into water slightly acidulated with sulphuric acid, and well soaked, dried, washed with bromide of potassium, rinsed, and dried again. Sir J. Herschel states that in point of direct sensibility, the chrysotype paper is certainly inferior to the calotype; but it is one of the most remarkable peculiarities of gold as a photographic agent, that extremely feeble impressions, once made by light, go on afterwards darkening spontaneously, and very slowly, apparently without limit, so long as the least vestige of unreduced chloride of gold remains in the paper. To illustrate this curious and important property the following experiments may be mentioned:—It is well known to chemists that oxalic acid heated with solutions of gold, precipitates the metal in the metallic state. Light, as well as heat, also operates in this precipitation; but, to render it effectual, several conditions are necessary: 1st. The solution of gold must be neutral, or very slightly acid. 2nd. The oxalic acid must be added in the form of a neutral oxalate; and 3rd, it must be present in a certain considerable quantity, which quantity must be greater, the greater the amount of free acid present in the chloride. Under these conditions the gold is precipitated by light as a black powder; if the liquid be in any bulk, and if merely washed over paper, a stain is produced, which, however feeble at first, under a certain dosage of the chloride of gold, oxalate, and free acid, goes on increasing from day to day, and from week to week, when laid by in the dark, and especially in a damp atmosphere, till it acquires almost the blackness of ink; the unsunned portion of the paper remaining unaffected, or so slightly as to render it almost certain that what little action of the kind exists is due to the effect of casual dispersed light incident in the preparation of the paper. If paper prepared as above recommended for the chrysotype, either with the ammonio-citrate or ammonio-tartrate of iron, and impressed with a latent image, be washed over with nitrate of silver instead of a solution of gold, a very sharp and beautiful picture is developed of great intensity. These pictures may be fixed by hyposulphite of soda.

Citric Acid.—This acid derives its name from the citron, in the juice of which fruit it is present in great abundance. It is met with also in most acid fruits, such as the gooseberry, cherry, raspberry, and orange. It is obtained from the citron by saturating the juice with chalk; an insoluble citrate of lime is thus formed, which, after well washing, is decomposed with sulphuric acid. The liquid is concentrated by heat, and allowed to cool, when citric acid separates out in large crystals. This body has a very agreeable acid taste; it is easily soluble in water and alcohol, but its aqueous solution soon turns mouldy; it will, therefore, be preferable, if it be desired to have a solution of citric acid always at hand, to keep it in solution in alcohol. This acid can frequently replace acetic acid in photography. M. Gaillard was the first to propose this substitution in the preparation of pyrogallic developing solution for negatives. In this case the image does not appear so rapidly, but with more regularity and sharpness; and the negative, instead of being of the ordinary brown colour which acetic acid gives to it, is usually of a fine blue-black tint. Citric acid must be used in far smaller quantities than acetic acid. It should not exceed more than half the weight of the pyrogallic acid employed.

Citric acid is extensively used by the calico printer, for discharging the mordant from the cloth in patterns. It is used in dyeing silk, and also in medicine. When united with bases it forms *citrates.*

Citrate of Lime is formed when citric acid is added to lime water and the solution boiled; it forms a white insoluble powder.

(*To be continued.*)

A Catechism of Photography.

PHOTOGRAPHIC EXCURSIONS—*(continued)*.

Q. Does the colour of objects affect the photographic impression?

A. It does; and therefore, in taking a proof, it is necessary to bear this fact in mind, if we desire to secure an image perfect in all its parts, and harmonious as a whole.

Q. In what way is the photographic impression affected by colour?

A. Certain colours produce scarcely any perceptible effect, or, are very slow in action. Such colours are black, red, yellow, and green. Others, on the contrary, as blue, violet, and white, are very rapid in action. Thus, for trees, old ruins, &c., it requires longer time to procure a perfect image than for recently erected structures, white tents, or clear skies.

Q. Is any artistic care required in the arrangement of the picture?

A. Yes. In order to secure a pleasing photograph, the operator should so select his point of sight as to give the most picturesque effect to his picture, and should, if possible, introduce a figure or a carriage, so as to furnish a standard for relative proportions.

Q. In taking views, is it best to work by sunlight or by ordinary daylight?

A. It is best to work on a bright, sunshiny day. Besides the increased rapidity of action which it secures, it gives greater relief to the picture by a full effect of light and shadow. But the operator must exercise discretion in this, as in all the other departments of photography, otherwise he will produce pictures neither remarkable for beauty nor effect.

Q. How are the negatives taken to be preserved?

A. They should be carried in the portfolio, as already stated, and be carefully preserved from the action of light.

Q. Is it best to use the waxed paper on a photographic excursion?

A. Yes; the waxed paper is very convenient. The certainty with which the wax preserves the paper which has passed the bath of iodide of potassium, permits the preparation of a large quantity. When it happens to fail, it must be prepared anew with a solution previously made, or made on the spot; very great care, however, must be taken, that all the basins or dishes used to contain the solution should be chemically clean.

Q. How are these manipulations to be performed by the travelling artist?

A. It is necessary to procure a room for this purpose, and to cover the windows with yellow or orange coloured paper, so as to exclude the chemical rays of light. This may be done very easily; but it is still easier to reserve all such chemical operations till the evening, and work safely by artificial light.

Q. How are the images to be developed?

A. The images should be developed in the ordinary way, with gallic acid, afterwards washed in clear water, and *partially* fixed in a saturated solution of common salt, or in a bath of bromide of potassium. Subsequent to this operation the proof must be washed again in fresh water, dried between blotting paper, and stowed away in the portfolio, until a convenient time offers for fixing them with hypo. in the regular way.

Q. When it is difficult to procure distilled water or rain for these manipulations, will ordinary river water answer the same purpose?

A. Yes, if the following instructions be adhered to:—Add to the water four or five drops of aceto-nitrate; then filter carefully; after this it will serve for any purpose that may be required.

Q. Are not accidents very likely to occur in carrying the photographic apparatus about the country?

A. Accidents may, and do frequently occur; but the practised operator is prepared to meet most of them by carrying with him a more than sufficient supply of all the chemicals he may require, and such tools as may enable him to remedy any little damage that may happen to his stand or camera box. The worst evil the operator has to fear is, the spoiling of his proofs, as this is often irreparable, but a proper amount of care will secure him from this; and, as a very proper precaution, he should always take two or three proofs of the same building or landscape, and thus make sure of a good working negative.

END OF PHOTOGRAPHIC CATECHISM.

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, May 17, 1859.

In our last paper we promised to speak of some of the photographic curiosities in the Paris Exhibition. We shall mention, in the first place, a number of positive proofs in which the black parts are of carbon. This is one of the latest steps that photography has made towards perfection. If it be impossible, for the present, to obtain and fix the natural colours of objects by photographic means—we shall see presently that *impossible* is not exactly the word—it is a great thing to obtain an image that will last for ever, whatever be its colour.

Silver and salts of silver, bichromate of potassa, and the whole list of sensitive agents described by photographers, do not possess the permanency or stability of carbon—an element which resists all our chemical means of destruction. Some of our readers will, perhaps, remember an anecdote that made a little sensation in Paris about ten or twelve years ago. A manufacturer of marking ink praised his produce to such a degree, that every one thought it must be absolutely impossible to erase any characters written with it. Proud, to the highest degree, of his invention, he took a bottle of it to one of our friends, a young chemist, who begged him to write upon a piece of paper the words "*Encre indélible*," and to sign his name underneath. Our manufacturer willingly complied, and the next day the paper was returned to him with his signature, and the words "*Encre délible*." Our friend had taken out the syllable "*in*"!

Carbon proofs have been exhibited by Mr. John Pouncy, of Dorchester; in all, ten positives—views from nature, portraits, copies of engravings, &c.—obtained by a process with which the readers of the "Photographic News" are already acquainted. We may safely affirm, that the most attentive observer could not distinguish these proofs from ordinary photographs.

MM. Garnier and Salmon have also exhibited a considerable number of carbon proofs, some on paper and some on glass. We are really surprised at the high degree of perfection to which this new and important method of photography has already soared. The proofs exhibited by Messrs. Garnier and Salmon are larger than those of Mr. Pouncy, but they are hardly equal to the latter in neatness of outline.

We have also three proofs by M. de Brebisson, of Falaise, representing the "Rocks of Noron" (Falaise). All three are taken from the same negative. One was obtained by chloride of silver; the second by nitrate of uranium; the third by the carbon process. The two former are very good proofs, and in every respect equal to the other views exhibited by this photographer. The carbon proof has not succeeded quite so well, but is really so good, that this essay is doubtless the forerunner of many a better.

We must mention, *en passant*, some lithographic stones exhibited by M. Asser, of Amsterdam. They are engraved photographically, and M. Asser calls them "positifs à l'encre d'imprimerie" (positives in printing ink), and

"transport autographique sur pierre par un cliché positif sur papier à l'encre lithographique," or the transportation of a positive proof in lithographic ink on to stone. We are not acquainted with M. Asser's process. The specimens exhibited are far from perfect, though they appear to be the result of many interesting experiments, and as such deserve notice.

Let us pass to another subject:—M. Testud de Beauregard has "taken in" more than one unconscious admirer of photography. Many have left this exhibition with the impression that M. Beauregard has obtained photographs of objects in their natural colours. This is true, but only to a certain extent. A large and fine proof, exhibited by this photographer, represents some poppies, sweet-peas, and corn-flower (*centaurea*), in a glass of water. Underneath we have the inscription: "Colours obtained Photographically," &c., and in the catalogue, "Positives representing flowers with their colours obtained without touching up, and by a single exposure to light," &c. The sweet-peas are white, the corn-flower blue, the poppies red, and the leaves and stems green. The whole is on a brown back ground. "Colours!" exclaimed a friend. "Yes!" said we, disguising an old couplet—

"The poppies are red, the corn-flowers are blue,
I was taken in . . . . . and so were you!"

The red colour has succeeded best, next come the green stalks and leaves; the blue of the corn-flower is faded, and the white pea has a yellowish tint. The glass and water are beautifully transparent, and taking everything into consideration, this is one of the most extraordinary proofs in the Exhibition, and well calculated to astonish the unconscious beholder, and those amateurs of photography, who still maintain it impossible to produce anything like the colour of the natural object in a permanent manner, by photographic means alone.

The process employed by M. Testud de Beauregard was patented in London for the inventor, but in the name of Mr. Charles Cowper, on the 12th December, 1857. No salts of silver are employed. The whole secret consists in the use of gelatine or gum and bichromate of potash. This mixture, as is well known, becomes insoluble in water by the action of light. If, before it be submitted to exposure in the camera, certain insoluble colouring matters be mixed with it, such as charcoal for the blacks, vermilion for the reds, &c., these colours remain fixed and insoluble on those parts of the proof upon which the light has acted. All the rest of the composition is washed off with water, and the image remains coloured.

It is no easy work to manage the colours in such a way that each part of the proof receives its proper tint, and we think it is almost impossible to arrive at a high degree of perfection, by this process, in an artistic point of view; but as a *curiosity*, the proof exhibited by M. Beauregard is interesting in more points than one.

M. Wagner, of Paris, has exhibited some very remarkable microscopic proofs. Among them we notice the speech made by the Emperor of the French at the opening of Parliament this year. It is copied from the *Moniteur*, and occupies two whole columns of that paper. The image is barely visible with the naked eye, and requires a tolerably powerful microscope to be read.

But far more interesting than these *tours de forces* are the photographs of natural microscopic objects, exhibited by Messrs. Nachet, by M. Bertsch, and by M. Bernard, of Paris. Here we have faithful copies of microscopic *foraminiferæ*, *diatomaceæ*, &c., which deserve the highest praise. We do not know a wider field for photography than that of natural history. The production of such proofs as those just alluded to ought to be encouraged. The objects they represent become daily more interesting as natural science progresses; and men of science, habituated as they are to the stern reality of facts, and the faithful representations of natural objects, already find in photography a most valuable aid in which they may place entire confidence. We cannot praise too highly any endeavours made in this direction by photographers, and we hope soon to see our professors of botany and zoology in possession of complete sets of photographs representing the types of the families and genera of *infusoria*, *foraminiferæ*, *sponges*, *minute corals*, *algæ*, &c., by which they may render their lectures on these wonderful creatures doubly interesting and intelligible to every one.

We would add that attempts have been also made to reproduce by photography the more minute anatomical parts of the body of animals. Not only success in the art, but a vast amount of practical utility attends these endeavours.

Madame Laffon, of Paris, has sent to this exhibition, amongst other photographs which we shall not mention here, two silk hand-screens, upon which very pretty engravings have been copied photographically on the silk. These are most elegant, and have been universally admired.

M. Garnier, of Guernsey, has exhibited some portraits obtained at night by means of the electric light. They are curious, certainly, and that is all we can say of them. They remind us of some of the first attempts at photography on paper. When our overnight literary duties shall have completely prevented our rising from our bed before sunset, we shall, perhaps, deem it worth while to have our portrait taken by the electric light and in the *atélier* of M. Garnier, but not before.

Another interesting memoir of the indefatigable M. Niépce de St. Victor is presented to-day to the Academy of Sciences with the title "Memoir on Thermography; or, Calorific Radiations considered as a means of producing Images on Sensitive Paper." This work, which will appear in the *Comptes Rendus* and in *Le Cosmos*, has, doubtless, its place reserved in the "Photographic News." We would, however, call attention to one most remarkable fact contained in it: when images of engravings, letter-press, &c., are being produced by means of heat alone, it is found by experiment that when certain salts are employed, the *white* portions alone are produced, whilst, when other salts are used, the *black* portions alone are engraved. This shows clearly that the particular *nature* of the substance employed has an immense influence on the phenomena observed. Heat, it seems, will pass through the black portions of an engraving to attack the sensitive photographic paper, which is placed in contact with the former, when nitrate of silver and chloride of gold are employed together; whilst, if nitrate of silver be employed alone, this heat seems to pass only through the white portions. There are, moreover, many other parts that will be read with interest.

M. Faye has just read, at the Academy of Sciences, a long dissertation upon one of the most curious astronomical phenomena that our generation ever witnessed, namely, the splitting up of Biéla's comet, which, as is well known, became, at a certain period of its existence, two comets instead of one. M. Faye shows that a similar phenomenon was formerly remarked by the ancients to have happened to the comet of Ephorus, spoken of by Seneca. He affirms that this phenomenon is to be attributed to the intervention of a foreign attractive force, and that a similar one, namely, that of the sectioning of the nucleus, is not of rare occurrence, especially among the less brilliant telescopic comets, and was actually observed in Donati's comet of last year. In these cases a series of secondary nuclei are formed in the head or nucleus of the comet. M. Faye calls attention to the fact that Biéla's double comet is expected to return to our part of the universe in the year 1860, when it will, doubtless, form a most interesting object of research for astronomers.

M. Hesse, a distinguished naturalist, of Brest, has just communicated to the same Academy a most laborious series of researches on some minute animals of the class cirrhipoda, in which these curious little beings are studied from the moment they leave the egg, through all their wonderful metamorphoses, until they enter the adult state. The result of this author's work, which is accompanied by more than one hundred water-coloured drawings, is that the cirrhipoda which have been classed first among the annelides,

then among the mollusca, then, again, with the crustacea, must definitively be ranged among the latter. To the class of cirrhipoda belong the "acorn shells" (*balanus*) and barnacles found on our shores or attached to ships. The *ship barnacle* (*Pentalasmis anatifera*) derived its specific name *anatifera* (which signifies a thing which gives birth to a goose) to a rather singular circumstance. An old writer, named Gerard, expended, in the year 1636, a large amount of logic to prove that these creatures developed themselves into barnicle geese! He says that their shell "cometh to full maturitie and falleth into the sea, where it gathereth feathers and groweth to a fowle!" M. Hesse's doctrines certainly do not go so far as those of this old lunatic; but the metamorphoses undergone by these cirrhipoda from the moment they leave the egg to the time of their reproduction, are quite as wonderful as the fabulous account given above. Those who would witness them must take the animal in the egg and study it through its entire development (a task of some months) under the microscope. Whilst admiring M. Hesse's beautiful water-coloured drawings of these little beings in their different stages of life, we were struck with the thought that an immense amount of trouble would have been spared had he brought photography to his aid.

P.S.—M. Nièpce has just found a method of transforming his red photographs, of which we have already spoken, into black ones. For this, a red proof is plunged for a few seconds into a dissolution of per-chloride of iron (5 per cent.), to which 1 per cent. of hydrochloric acid has been added. In a second or two the proof is of a dark green, and by washing with water soon takes a fine black tone.

THE PHOTOGRAPHIC SOCIETY.

In justice both to Mr. Heisch and Mr. Malone, we consider ourselves bound to publish the following letters, which have been addressed to us by these gentlemen:—

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—As I observe in the report of the last meeting of the Photographic Society a statement which is likely to convey a false impression to your readers, I shall feel obliged if you will allow me to state the facts in your journal. The statement I allude to is this:—"In reply to a question by Mr. Malone, he was informed that Mr. Heisch had written to the secretary that he had neither time nor inclination to attend the collodion committee, and that he considered a great liberty had been taken in *proposing* his name without his consent." This would imply two things:—1st. That I had been asked if I would serve on the committee; 2nd. That I thought Mr. Malone had taken a great liberty in *proposing* my name. Had the secretary read my letter, it would have been seen that neither is true.

If Mr. Malone thought I could be of use on the committee, he had a perfect right to propose that my name should be added, which he did with the express understanding that I should be asked if I were willing to serve.

Instead of this, the first intimation I had of the matter was the receipt at 10 a.m. of a printed *summons* to attend the collodion committee at 4 p.m. of the same day.

I, of course, concluded from this that my name had been placed on the list of the collodion committee without reference to me, and as I considered such a proceeding (considering especially that I am not even a member of the Society) as an unwarrantable piece of impertinence, I replied that if my name had been *placed on* the collodion committee (not *proposed* as stated), it had been done without my knowledge, and I had neither time nor inclination to attend —the want of inclination being caused by a dislike to have anything to do with those who could treat a perfect stranger in so uncourteous a manner.

In conclusion, I must add that there are many members of the committee for whom I entertain the greatest respect, and who, I feel sure, were no parties to such conduct.—I remain, yours faithfully, CHARLES HEISCH.

Middlesex Hospital, May 10, 1859.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—In the report of the last meeting of the London Photographic Society, as given in the "PHOTOGRAPHIC NEWS," I find an editorial remark, which requires a few words from me in explanation. You express surprise at my satisfaction with the answer given me by the secretary respecting the addition of certain gentlemen's names to the list of the collodion committee.

I was satisfied, because I found it was not intended to exclude either of the gentlemen I proposed on the ground of their being non-members of the Society; and further, because I learnt that Mr. Spiller, who was unable to attend the first meeting, would attend in future, if summoned and free to do so. Mr. Heisch declined, as you are probably aware, because he was peremptorily summoned without having been first asked if he had any objection to attend, as was proposed. He does not object to the use *I* made of his name.—Yours very truly, T. A. MALONE.

London Institution, Finsbury Circus, E.C., May 10.

Miscellaneous.

CONVERSAZIONE AT THE PHARMACEUTICAL SOCIETY.—There are but few of the arts and sciences which are not now more or less intimately connected with photography. Each day, almost, sees its application to some novel purpose, and yet the extent of its capabilities is probably far from being reached. Its power of depicting a field of battle, on which thousands of men are engaged in mutilating and killing each other, appears to us as nothing very extraordinary; but who, a few days since, would have believed it possible for this agent to produce a trigonometrical plan of this same field? Its triumphs, however, as we are well aware, depend less on the manipulator than on the substances he employs; hence, photographers are deeply indebted to the Pharmaceutical Society for the effort it has made to insure purity in the manufacture of compounds, without which photography could not exist. The beauty of the specimens exhibited in its museum is such as to attract the admiration of all who look at them, even if their knowledge of chemistry extends no further than that of a correspondent who wrote to ask us for a remedy for a silver bath, which was at the same time too acid and two alkaline. An excellent opportunity was given us on Tuesday evening of judging of the extent to which chemists are interested in this institution. At the *conversazione*, held there on the evening in question, the visitors filled not only the rooms, which are large and numerous, but a goodly number overflowed into the passages. Happily, there were no ladies present, and thus the inconvenience arising from this circumstance was of little importance. The arrangements for the entertainment of visitors were, we believe, made under the direction of the esteemed vice-president of the society, Mr. Bird, and were in every respect excellent. Numerous microscopes were placed about the rooms, showing the wondrous effects produced by viewing crystals of various substances through the medium of polarised light, electro-motive engines, and many other scientific inventions. Of course, there were plenty of stereoscopes, and a large variety of slides of average excellence, but *the* photograph was that of the moon, by Mr. De la Rue. Seen in one of Professor Wheatstone's reflecting stereoscopes, made expressly for the purpose, it is one of the most interesting objects it is possible to conceive. In this stereoscope the moon appears a solid globe moving in space, of the same apparent diameter, as when seen moving in the heavens with the naked eye.

THE BROMIDES AND IODIDES OF BISMUTH, ANTIMONY, AND ARSENIC.—At a recent meeting of the *Académie des Sciences* M. Nickles read the summary of a paper on the definite bromides and iodides of bismuth, antimony, and arsenic. "Very little is known of the definite state of these compounds, nor has it hitherto been possible to study their physical qualities. The preparation of some of them, by the ordinary processes, is not unattended with danger. The three metals in question combine with bromine with so much force, that the phenomenon is accompanied with combustion, projection of the liquid, and even detonation. Sérullas, who has made the most careful experi-

ments upon them, prepared them by direct union, adding the metal only gradually to the metalloid. Having occasion for several of these compounds in making some researches, of which I shall have to speak later, and struck with the great difficulties presented by the ordinary mode of preparation, I endeavoured to simplify it, and have succeeded so well that henceforth the preparation of these compounds may be classed among the most elementary processes. At the same time they may be obtained in the state of very clear crystals, which allowed me to define the form of several amongst them. The principle of my process is the same in all cases, with regard to these compounds, and consists simply in causing the bromine or the iodine and the metal to re-act, with the assistance of a liquid, which should be equally a solvent for the metalloid, and for the compound it is the object to obtain. In this manner I prepare bromide of bismuth by projecting the powdered metal in anhydrous ether, containing its own volume of bromine, and the bromide of arsenic or of antimony, by causing the powdered metal to re-act upon the bromine, diluted with sulphide of carbon. The same process is applied for the iodide of arsenic and that of antimony, both soluble in sulphide of carbon, and crystallisable from that liquid. The three bromides are very unstable in conjunction with water. However little of this liquid the solvent may contain, an equal quantity of bromide is obtained in a state of white deposit. This re-action is so evident that it may be employed to ascertain the presence of a very small quantity of water in any of the liquids in question. The bromides of bismuth $Bi\ Br_3$ of arsenic $As\ Br_3$ and of antimony $Sb\ Br_3$ are fusible at a moderate temperature. They are, moreover, deliquescent. On exposure to the air they become liquified, in the order in which they have just been named. The first becomes crystalline in a vacuum, and exhibits beautiful prisms, resembling those of the bromide of arsenic. The bromide of antimony exhibits rhomboidal octohedra, occasionally modified by terminal points, which constitute oblate prisms of 69 degrees, terminated by points of 80 degrees. The iodides of arsenic and of antimony are unalterable when exposed to the air. They are isomorphous, and belong to the rhomboidal system. Their form proceeds from a double pyramid of six facets, whose summits are modified by a terminal facet. Frequently this facet is so developed that the crystal assumes the form of a hexagonal table. These two pyramids intersect each other at their base, at an angle of 133° 62′, and form with a terminal face an angle of 120°. At the side of these principal faces are frequently found secondary facets which appear to belong to hemyedrical figures. These forms are easily developed in iodide of arsenic, when crystallised with an excess of iodine. The result loses this excess by exposure to the air. The crystalline form is not injured by this loss, the colour only being changed from brown to red. As yet no double salts formed by these bromides or iodides are known, doubtless because these latter become resolved in water, even when impregnated with an alkaline bromide or iodide. I have obtained some, however, in operating in the absence of this liquid; thus it is sufficient to warm the syrupy bromide of bismuth with some bromide of ammonium to make it deposit when cooling beautiful yellow plates of the double compound in question. In similar circumstances the same bromide will give a double salt, crystallised in beautiful prisms. These bromosalts are easily soluble in water. The general process here described is easily accomplished, even by the inexperienced chemist. Doubtless the bromised liquid becomes heated when the operation is quickly performed, but accidents may be easily prevented by plunging the vessel into cold water. In this way the reaction may be immediately modified, as it may also be assisted, by the use of hot water; these precautions are less indispensable with the iodides. I have found that light excites the reaction. Iodide of arsenic is used in medium, and its preparation by a wet process furnishes it of a perfectly constant composition, which is not the case when prepared by a dry process. I have said above that the compounds of which I have been speaking are not known under any very definite form, but I should add that since these researches were undertaken, the bromide and iodide of arsenic have been obtained by the dry process, in a crystallised state, by Mr. Wallace. I have only just received the news of this in the last number of the *Philosophical Magazine* for April, 1859. From the facts that I have just submitted, and the results that I have the honour to lay before them, the Academy will easily perceive that my labours and discoveries are perfectly independent of those of the English chemist."

PHOTOGRAPHIC INCIDENTS.—One of the spectacles appertaining to photography is that which the departure of our troops to Italy offers. There are parting scenes and enthusiasm which it is far from useless to reproduce. Over and above the interest they excite, one may thus collect almost officially documents which will be invaluable for the history of our times. Among the military baggage I have seen an object glass, which was likewise going to make the campaign. The example given by Mr. Fenton in the Crimea will not, therefore, want imitators in Italy. Thanks to photography, we may be able to get official portraits of all the personages who may be destined to play an important part in the moving drama about to commence, perhaps even now begun, on the banks of the Ticino. The greater part of the *ateliers* have already been put in requisition by a vast number of soldiers of every grade, who, before embarking for Genoa, or traversing the Alps, desired to exchange their portraits. I give you a photographic anecdote, for the authenticity of which I can vouch. A photographer, some of whose works figure in the Exhibition at the Palace of Industry, was called upon by a man who fills a distinguished position in the world, who asked him what a portrait (negative) and two proofs would cost, and was told, "The price of the portrait will be thirty francs, and the two proofs ten francs." "Very well, let me sit and you will give me two," replied the inquirer. Some days later this order was duly delivered, only a difficulty arose with respect to the price. The party photographed was surprised that he should be aske d for fifty francs instead of twenty francs, pretending that he only meant to order the second proofs. Will you believe it, the photographer could not make this individual comprehend that he must pay the price of the negative, and was forced, to save any further trouble, to give way to the man, who persisted that he only wanted the second proofs. Another Bœotian lately wanted some visiting cards bearing his portrait, and called upon a photographer to ask the price. "Fifty francs a hundred," was the reply. "Very well, make me six." "Six! you mean six hundred, then?" "No, only six!" "Very good," said the photographer, who was so far in the wrong that he failed to make the individual understand that the cost of six would be pretty nearly the same as a hundred. When they were delivered, the disciple of Nièpce got three francs for the six proofs, "since," as the man of the visiting cards remarked, "that was at the rate of fifty francs the hundred." These anecdotes remind me of the parrot buyer. He was an Englishman, who haggled regularly every day for a week over the price of a superb grey parrot. "Oh! sixty francs, that is very dear," said he, with that accent with which we are all familiar. Finally, after a melancholy sigh, he one day appeared to have come to a grand determination. "Still sixty francs for the beautiful parrot?" he asked. "Well, well! *have him roasted, and give me a franc's worth; that will satisfy me!"—M. La Gavinie* in "*La Lumière.*"

Photographic Notes and Queries.

NEW DRY COLLODION PROCESS WITH LINSEED.

SIR,—From the commencement of your labours as a journalist, I have been one amongst the thousands of your readers. But not being afflicted with the *cacoethes scribendi*, I have hitherto refrained from addressing you. I am induced, however, at length to do so, in consequence of a letter from "M. M. D.," inserted in the "PHOTOGRAPHIC NEWS" of March 18th, 1859, in which he asks, on behalf of himself and others, for your advice as to the best dry collodion process. I have tried many—the honey, Fothergill's, collodio-albumen, &c., &c., and have, with all, occasionally met with success, but far oftener with failures. Do not suppose that these results have been from want of patience, or the common fault of "forsaking the old love for the new;" not so; each system has had from my hands a fair trial, and been found wanting. As regards the collodio-albumen process, although apparently easy, still its greatest admirers must admit that it is costly, and requires great care and delicacy in the manipulation, and that, in consequence of the perpetual uncertainty attending it in respect of blistering, creasing, &c., &c., it is (with all due deference to Messrs. Sidebotham and Woodward, in whose masterly hands pro-

bably any process would be good) to the amateur nothing but a delusion and a snare.

But, sir, I have discovered a simple, cheap, and infallible process; one which, in the hands of the veriest tyro who ever stained his fingers with nitrate of silver, will give results certain and excellent.

My system is as follows:—Linseed, 2 ounces; water, 1 pint; let it remain by the fire, *without boiling*, until it forms a strong mucilage; strain it from the seed and cool. When cold, strain again through fine muslin, and if not for immediate use, add a small piece of camphor; but I prefer it always fresh. Coat your plate with any good negative collodion; let it set well and sensitise in the usual manner; drain; immerse in water 15 seconds; drain; pour on the linseed two or three times, and set it to dry spontaneously. Note—do not use the same linseed for more than one glass.

The nitrate bath I use is—nitrate of silver, 12 parts; water, 200; acetic acid, G., 30 drops to 40. For developing I find the second solution, p. 160, vol. i., the best.

The picture with this process is always clearly distinguishable before developing. Allow me at the same time to say that many failures, both of amateurs and professionals, arise from their using too strong a nitrate bath. I have found that a weak one requires no washing, and gives better results; if the bath is sufficiently powerful to blanch the collodion, it is all that is required; let it be understood that I am now speaking of the dry process.

In conclusion, I beg to assure you that my system is no visionary nonsense, but *bonâ fide*, and if you think fit to publish this, I have the most perfect confidence that you as well as myself will receive the thanks of many of our unhappy, disappointed, brother photographers.

Nantua (Ain), France. W. W. Hughes.

THE FOTHERGILL PROCESS.

Sir,—I have been induced, in consequence of Mr. Keene's communication in the last number of the "News," to try the effect of the addition of 6 grains of chloride of ammonium to the ounce of the albuminous solution, employed in the Fothergill process, and am glad to be able to confirm all that has been said of the increase of sensitiveness acquired by plates thus prepared. I exposed, yesterday morning, eight stereoscopic plates thus treated, and brought home with me—after an exposure just one third less than would have been required for plates prepared with albumen alone—as many perfect negatives, with the middle tints exceedingly well rendered, and details, even of foliage in deep shade, well brought out. If the keeping qualities of plates thus prepared at all approach those obtained by the employment of Mr. Fothergill's original formulæ, the modification thus suggested will leave nothing to be desired.

I fancied that the formation of chloride of silver, caused by the contact of the preservative solution with the free nitrate in the molecules of the collodion film, might be prejudicial to the delicacy of the developed picture, but I cannot perceive, even with a lens of considerable power, the slightest appearance of granulation; in fact, I do not think that I possess any negatives, obtained even by the Taupenot process, of greater clearness and brilliancy than these. Upon the whole, I strongly recommend the addition of the chloride of ammonium to the albumen, since greater rapidity of action is insured, without the sacrifice of that gradation of tint, for which the Fothergill process is so remarkable.

In what way the preservative quality of the solution is affected by the addition of the chloride, remains to be proved; possibly the great increase of sensitiveness thereby acquired may render the imprisoned atoms more susceptible of change by those deteriorating influences which, even in darkness, are always at work; but, be this as it may, this modification is important and valuable.

I purpose, at the first leisure time that offers, to try some experiments with the gum arabic solution, which, I conceive may be destined to play a very important part in this process. With the *endosmic* property of gum water, under certain conditions, many of your readers are probably acquainted; this property, aided by the force of chemical affinity, which obviously exists between the nitrate and preservative solutions, may, eventually, conduct us to the comprehension of the *rationale* of this interesting process. W. L.

NOTES ON THE BLISTERING OF DRY PLATES.

Sir,—I see in No. 33 of your invaluable paper one who signs himself "Photo." in great trouble about his plates blistering; he cannot have more vexations than I have had from the same cause. It appears that none can thoroughly explain the cause of blistering. I am led to believe that it is the expansion of the albumen in becoming thoroughly wetted with the developing and washing, which causes blisters to arise; whatever is the cause, it is the greatest drawback to the dry process, and if you allow me a small corner of your paper, I will give "Photo." my plan of preparing dry plates, which prevents blistering and makes a negative which, I think, will equal any:—

Clean your glass well, slightly warm it, and coat with—

Gelatine	33 grains.
Water	2½ ounces.
Alcohol	½ ounce.

Drain it well off and dry thoroughly; this must be slightly warm. Coat with a thin collodion; sensitise in a 35-grain nitrate bath, slightly acid with acetic acid; wash your plate in clean rain water until all greasiness disappears; drain for a minute, and coat with the albumen of two ordinary sized hen's eggs, water two ounces. Work it round your plate for one minute, drain off and wash your plate, set up to dry in the dark, and when thoroughly dry it is ready for exposure. Water must not be poured on the plates to wash them; get two toning baths, and put as much water as will make them about ¾ of an inch deep, and wash off the nitrate in one, and the albumen in the other, by putting in the plates and waving the water over them; rather over-wash than under; change your nitrate washing water every six stereoscopic plates, and your albumen washing water every three plates. Develop with—

Pyrogallic acid	1½ grains.
Water	1 ounce.
Acetic acid	20 minims.

For a stereoscopic plate, put fully an ounce of your developing solution in your developing glass, and add about eight drops of your nitrate bath; go on with this until all your details are fully out, wash out your glass, and put half an ounce of developing in, and add 8 or 9 drops of nitrate bath; this should bring up the desired intensity. Fix with hypo. or cyanide, either will do; I use cyanide 10 grains to the ounce of water. W. A. Young.

Haddington.

PORTABLE STAND FOR A DEVELOPING BOX.

Sir,—I have a plan which I can recommend to "P. F. P.," p. 23; it is rather a lazy looking one however. Procure a fold-up seat, which when shut up is a little (say 6 inches) shorter than the length of the developing box; then cut down the legs of a large tripod to the length of the box, so that they may go inside. The stand being so much nearer the ground, does not, of course, vibrate so much, and I found one could work very well sitting down, the bottom of the box being just so high that one's knees could go under it.

H. S. I.

CLEANING DAGUERREOTYPES.

Sir,—I have cleaned and restored faded daguerreotypes with great success by washing with the cyanide fixing solution, and then well washing and drying. I don't think anything else is required, unless they are very bad, and then I am afraid their case is hopeless. T. Millard.

Stratford.

SILICIC ETHER AS A VARNISH FOR NEGATIVES.

SIR,—My attention having been engaged on the old subject of "varnish," I think the following might be useful to some of your numerous subscribers. It consists in a solution of the silicic ether, $3\ C_4\ H_5\ O.\ 4\ Si\ O_3$: it is solid, hard, and perfectly transparent; dissolves freely in alcohol and ether; and is unaffected by most chemical reagents, hence its use in varnishing baths, dishes, &c. It might besides be used as a species of collodion. Its value as a negative varnish is obvious, as it is colourless, free from stickiness, and drying without the application of heat, becomes almost like glass. It would, undoubtedly, be of great use if prepared sufficiently cheap. Should this prove of enough interest to merit a place in your valuable journal, I shall be happy to send you its mode of preparation.

H. C. JENNINGS, Jun.

[We shall be glad if our correspondent will forward the mode of preparation of the silicate of ethyl. Ebelman, in 1846, described a bi-silicate ($C_4\ H_5\ O.\ 2\ Si\ O_3$), which answers to the description given by our correspondent, but its preparation is attended with a great amount of difficulty. We were not aware that a compound of three equivalents of ether and four of silicic acid had hitherto been discovered, and shall be glad of further information on the subject.—ED.]

PHOTOGRAPHIC MEMORANDA.

It has been pointed out to us that we should confer great service on photographers generally, if we were to publish a short list of such items as it would be desirable to write on stereograms or other photographs—such as the quality of light, season of the year, lens employed, width of separation, and of the two stations.

If our correspondents will forward to us the heads of any data which they think it would be desirable to record in this manner, we will consider the matter, and publish such a list as we can recommend in an early number.

ANSWERS TO MINOR QUERIES.

DETECTION OF WATER IN ALCOHOL OR ETHER.—*G. W. C.* The presence of water in either of these two bodies may very readily be detected, by allowing a drop of the suspected liquid to fall into a little pure benzol. On shaking them together, water will be shown by the liquid becoming turbid and milky; whilst, if the alcohol or ether had been anhydrous, it would have remained quite clear.

DRYING BOTTLES.—*Toby N.* asks how we recommend him to make a bottle perfectly dry inside after being cleaned in the manner recommended in vol. ii. p. 60. He is desirous of keeping a stock of clean bottles for any emergency; and if they were, at the same time, perfectly dry inside, instead of damp from the remains of the last washing water, they would do for putting collodion in, or any other liquid which would be injured by the presence of water. A bottle may be very easily dried in the inside in the following way:—After having cleaned the bottle perfectly, and drained it well, take a piece of glass tubing, about half as long again as the bottle, and having held the latter near a fire until it is as hot as the hand can bear, introduce the tube as far as it will go, and, applying the mouth to the other end, draw air through it for some time. The heat causes the greater part of the water to assume the state of vapour, which will be removed, as soon as formed, by sucking through the tube. After air has been drawn through for some minutes, heat the bottle again, and repeat the operation, and the moisture will soon disappear from the interior. If a drop of water still obstinately remains, it may easily be removed by placing one end of the tube close to it, and drawing air through by the mouth at the other end. The rapid evaporation of the water, under the powerful current of air thus made to pass over it, will soon take place.

SPLITTING OFF OF THE FILM.—*Verger.* One great disadvantage of most of the methods which have been recommended for converting positives into negatives is, the liability of the film to contract so much on drying that, in many cases, the film curls up, and splits off in large patches over the plate. Frequently on examining a plate which has been intensified with gold or bichloride of mercury, and then reared up to dry, the film looks quite perfect; but the very act of moving it from the position in which it dried, suffices to destroy the continuity in some point of the surface, and, once broken, the entire film begins to split in every direction. If *Verger* can manage to get the varnish on the plate before the splitting commences, the picture will be safe; but we have frequently taken up an apparently perfect plate of this kind, and, just as the varnish was being poured on, have been forcibly reminded that, "there's many a slip 'twixt the cup and the lip," by the spontaneous destruction of the film before our eyes.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

VAPORISATION.—Faraday has described, at vol. i. p. 70 of the *Journal of the Royal Institution*, some very careful experiments, by which he has shown conclusively that nitrate of ammonia, oxalic acid, perchloride of mercury, and, *perhaps*, oxalate of ammonia, evolve vapours at the ordinary temperature.

J. GREENHALGH.—Perchloride of mercury will dissolve in pure water, in alcohol, or in turpentine. One of these three solvents might, possibly, answer your purpose better than hydrochloric acid. We shall be glad to know what success you meet with in the experiment.

FRAXINUS.—You will not be able to convert your pair of single achromatic lenses into a portrait combination. The curvatures of the component glasses in the two cases are entirely different, and require to be calculated with a special reference to the work they are intended to perform. Such a series of articles may perhaps be given at some future time.

CLAUDE.—We will do as you request. The stereogram being one of the first you have ever taken, is very creditable, and shows no particular faults of chemistry or manipulation, other than may be remedied by a little experience. The lens is a very good one; but the aperture is rather too large. We will draw up a few memoranda to give with photographs.

NEMO.—It is a pity our correspondent has not some better employment than that with which he has lately occupied himself.

J. G.—We think it will be best to have the roof of your glass house made "ridge and furrow" fashion, as in the building for the Great Exhibition.

J. C. S.—Perhaps you immerse the coated plate too soon into the bath; that is the only remedy we can suggest, from what you mention.

A PUPIL.—We prefer the pyrogallic developing solution for negatives; although some operators succeed habitually in taking excellent pictures with a sulphate of iron developer.

ANTI H.—We will give you the information you require, if you forward us a stamped and addressed envelope.

LONDON.—Sulphate of baryta, although not *perfectly* insoluble in water, is as nearly so as any salt with which we are acquainted. Thus, sulphate of strontia, which is usually deemed to be insoluble, will still dissolve to a sufficient extent in water to give a precipitate with chloride of barium. For all practical purposes, however, you may consider that the sulphates of both strontia and baryta are insoluble.

EUXESIS.—You have, doubtless, used the chloride of gold in an acid state. Make it faintly alkaline with carbonate of soda, and you will no longer meet with the difficulty.

H. N. E.—Increase the strength of your nitrate bath.

PYRO.—Received.

A. X.—Your stereograms are very beautiful, and we are much obliged for them. They would, however, be much more interesting, were a description of the scene they are intended to represent appended to each print.

H. C. R.—Your silver bath is too weak; increase the strength, and the mottled appearance will cease.

V.—1. Very dilute nitric acid. 2. Yes. 3. Thirty grains to the ounce. 4. Either No. 2 or 3.

J. F. TAYLOR.—Received with thanks.

Δ.—You will not succeed very well at taking negatives with positive collodion and developing solution; you should employ collodion prepared on purpose for negatives, and develop with pyrogallic acid.

D. F. L.—Spanish white is carbonate of lime.

QUÆRIST.—Do not build your operating room at a greater height than will be sufficient to prevent the light which should come to it from being obstructed by surrounding buildings.

H. M. L.—The front lens of a portrait combination may be used for landscape photography, if fitted into an appropriate mount, with the convex side turned toward the ground glass of the camera; but such lenses are not so good as those made especially for landscape purposes.

READING.—The lens you call No. 3 is the best.

N. A. D.—A method of splitting paper was given at vol. ii. p. 36.

COL. ALB.—Mr. Keene has written some excellent articles on the Fothergill process in several numbers of the "PHOTOGRAPHIC NEWS." We cannot do better than advise you to study the letters by this gentleman.

F. WALKER.—The substance remaining behind, on dissolving your silver in nitric acid, hardly deserves the name which you have applied to it. Some people, doubtless, would agree with you, and style it "dirt;" but more worldly-minded persons would call it one of the precious metals—metallic gold.

DONE.—We quite agree with you that such conduct is grossly dishonest, and if it be in our power, we will put a stop to it; but we fear that nothing we can say will quite prevent such conduct.

LENS.—1. Aplanatic. 2. Add a few grains of metallic cadmium to your red collodion; the metal, having an affinity for iodine, will absorb it, with formation of iodide of cadmium, which will dissolve in the collodion.

Communications declined with thanks:—Fox.—Maby.—F. L. M.—J. S.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—H. S. Smith.—A. J.—L. H.—Y. A.—Amateur.—Cato.—T. L.—R. W. G.—Deliquescent.—F. G. O.—S. B. G.—No. 32.—F. and T.—R. M.—Q. U. O.—P. A. A.—An Engine in a Fog.—Oxide.

IN TYPE:—A. Keene.—Inquirer.—J. W. W.—J. B.—Viator.—A Kerry Man.—Thomas Barrett.—O.—John Sang.—An Amateur.—N. T. A.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 38.—*May* 27, 1859.

NEW PROCESS OF PHOTOGRAPHIC ENGRAVING.

BY M. BERCHTOLD.

THE heliographic process, invented by Nicéphore Nièpce more than thirty years ago, has been the starting point of all these beautiful discoveries which have raised photography to a point of perfection which could not have been hoped for fifteen years ago. Nièpce had, since the above date, attempted to engrave photographically, and this desideratum, at which he had already partly arrived, in 1829, is not yet completely attained.

The results obtained by Nièpce were very excellent in a photographic point of view, and the means by which he reproduced either a design or an engraving or a view in the camera, were even then so perfect that it seems surprising that they should have been so long laid aside.

The proofs which are obtained by employing the process of Nicéphore Nièpce are very fine, especially if, instead of ordinary designs or engravings, positive or negative photographs are employed; but there exists a great difference between these proofs and the photographic image, properly so called.

It is important to point out this difference, in order to understand the theory of heliographic engraving.

The photographic proof is formed by the colouration of the substance employed under the influence of light: the varying intensity of which gives more or less force to the tones of the image, and consequently adds roundness and effect.

In heliographic images, obtained by means of bitumen of Judea, this is not the case; the image is not formed by the colouration of the substance, but the varnish is modified by the action of the light in such a manner (possibly by a sort of desiccation or change in its molecular constitution), that it becomes more or less soluble, according to the intensity or duration of this action; by means of a subsequent washing with an appropriate solvent, the parts of this varnish that have not been attacked by the light are entirely dissolved, whilst in those parts which have been impressed there is a proportionate action.

The gradation of tint, which is very perfect in these images, is therefore due to a greater or less thickness of varnish, and not to its colouration, which is sensibly the same after as before its exposure to light.

In the numerous attempts at engraving, which have been made since the time of Nièpce to the present day, the metal which has been left bare in the dark parts of the design has been attacked and etched by an acid or by galvanic agency; and in order to give the plate the necessary grain for it to hold the ink, recourse is had to a process employed by engravers, which consists in covering the plate with a fine dust of resin, which is made to adhere to the metal by heating it, and which thus protects it from the action of the acid.

In reflecting on this process, and on considering the manner in which the half tones of the photographic image are formed, it is not difficult to understand that this powdered resin, which is spread equally over the whole surface of the plate, has a peculiar effect on these half tones, which are already covered with a certain thickness of varnish. On this account the results have never been satisfactory.*

Preoccupied with this inconvenience, I sought to produce a *grain* (which is indispensable, for it is only by offering a rough and granular surface that the metal will retain the printing ink) direct on the photograph; and after many attempts I succeeded in producing it on the positive proof by piercing it through by means of an engraver's *roulette*. This process, which gives a grain of admirable firmness and regularity, has furnished me pretty good results.

This process offers many important advantages: in the first place it simplifies the heliographic operations, since the exposure to light gives immediately a complete image, such as the acid will subsequently form in biting in the metal; besides which it admits of the employment of caoutchouc to consolidate the varnish, which cannot be employed when recourse is had to heat to form a grain with resin, since the caoutchouc is disorganised by the high temperature necessary.

I must remark that the proofs obtained are absolutely untouched, and that the biting in with dilute nitric acid has only been performed once; that is to say, that I have not employed a means which doubtless succeeds in the hands of a skilful artist, but which ought not to be employed in heliographic engraving processes.

This means consists in coating with a brush dipped in varnish, after the first biting in, those parts which are considered sufficiently black, so as to etch again those parts which want more force, and in performing this operation several times so as to attain vigour from an originally feeble proof.

This method, I repeat, may give good results, according to the talent of the engraver, but it does not constitute a process; it demands artistic talent, and is one of the ordinary processes of the engraver, and we all know what it is capable of yielding in the hands of a clever person. I think, then, that it can only be applied to heliography as an expedient, and I have, therefore, not wished to make use of it.

I have deemed it my duty to communicate these experiments, because they have given me results which may already be looked upon with interest, although I am convinced, from numerous trials, that this process, although preferable to the employment of powdered resin, is still very incomplete, and does not permit us to hope for the exact reproduction of a photograph with all the gradations of tint which constitute the rotundity of the image, and without which an artistic image cannot exist.

After experiencing many failures, I have then been forced to admit that these different plans are incomplete, defective, and I will say, almost impossible; and I am obliged to conclude that heliographic engraving, whether on copper or otherwise, by the employment of resins or bichromate of potassa, or even when taken on a plate of silver by the daguerreotype process, cannot give good results, except the photographic image (which is very perfect by either of these methods) is modified in some way, that each particular tone of the image may be represented by a different result (whether this be in grains or in lines).

It is indeed evident that since the final result is the obtaining of an impression by means of printing ink, it is necessary that the blackest parts of the picture should retain more ink than the other parts; and a simple inspection of an ordinary

* NOTE BY DAGUERRE ON THIS SUBJECT.—"Although M. Nièpce here speaks of iodine to darken and acid to engrave, these two operations have not given any gradation of tint. Indeed, the image being formed of the greater or less thickness of varnish, according as it is more or less attacked by the light, it is impossible that the acid should act on the metal in the same proportion. Thus it is that M. Nièpce has never made an engraving of a proof obtained in the camera." (*Historique et description des procédés du daguerreotype, par Daguerre*, 1839.)

engraving will show that a dark effect of greater or less intensity is produced either by lines of a greater or less size, or more or less approaching each other, or else by a grain more or less separated in different parts.

The formation of the heliographic image being very satisfactory, the problem to be resolved appears to me to be the following:—

To add to this image an effect of lines or grains, which should be appropriate to the different tints of the design, and differing for each tint, so as to preserve the proper relation between them; but the skill and intentions of the artist should have nothing to do with the arrangement of the granulation, or with the luminous action which is alone able to produce the result; in a word, light alone should augment or diminish the number of the strokes, and make them wider or closer, according to the requirements of the half tones.

I have just succeeded in effecting this—the strokes, differing according to the depths of the tone, becoming modified by the sole action of the light, and being more or less close and numerous according to the varying intensities of the different tones in the picture.

PROFESSOR BRODIE ON GRAPHITE.

Now that photographic printing in carbon is attracting some attention, we are induced to lay before our readers the following account of some important researches of Professor Brodie on graphite—the allotropic form of carbon which is likely to prove most useful in this branch of photography:—

On Thursday evening, 19th inst., Professor Brodie, of Oxford, delivered, at a meeting of the Chemical Society, a highly interesting lecture on the varieties of graphite, or blacklead, detailing the results of more recent experiments, by which he has established the existence of certain compounds of graphite. From an examination of the structure and properties of the several native and artificial varieties, Professor Brodie is inclined to divide them into two classes, of which the Borrowdale pencil lead and that from Greenland constitute the soft, *amorphous* representatives; while those of a platey structure, *exhibiting cleavage*, were more allied in character to the scales of graphite as they occur in cast iron. Under this second series are included the blackleads imported from Ceylon and New Brunswick, forming by far the larger proportion of those met with in commerce, and used for the ordinary purposes of coating iron work.

The lecturer next alluded to the well ascertained fact of the coke or "carbon points" employed in the production of the electric light becoming converted at their heated extremities into a description of amorphous graphite, resembling the finest Cumberland specimens, and he then exhibited the power possessed by one end of making a pencil streak upon paper. The alteration produced in the diamond by the action of heat was also attended with a conversion from the crystalline into the graphite condition of carbon, and seems to indicate that the latter is the most permanent state in which the element carbon is known to exist.

Professor Brodie described and experimentally exhibited his process for purifying the ordinary qualities of blacklead, and separating from them the silicious and other matters with which the native forms of graphite are nearly always intermixed. The treatment consists in digesting the crude blacklead in mixed nitric and sulphuric acids, whereby not only are the metallic impurities partially removed by solution, but the carbon, by assimilating the elements of water, becomes converted into a compound for which, at present, he could give no definite expression. Without alteration in physical appearance, a substance is produced which exfoliates in a remarkable manner on heating in a crucible—a change which has perhaps its best parallel in the action of heat on the orange crystals of bichromate of ammonia, whereby a condition of sesqui-oxide of chromium, very much resembling green or mixed tea, is produced, with an enormous increase in the bulk of material. Graphite which has undergone this change of volume is now so light that it will float on the surface, or remain suspended in water, so that by washing and decantation the heavy particles of sand will quickly subside, and be in this manner removed. The product answers to the description of pure carbon, leaving no appreciable amount of ash on incineration, and by compression yields a block equal in quality to the finest description of native blacklead. Professor Brodie pointed out the applicability of his purified graphite to the glazing of the coarser kinds of gunpowder, used for blasting; and recommended its use, as a lubricating material, in all cases where freedom from grit was of the first importance.

By the repeated action of nitric acid and chlorate of potash graphite becomes slowly changed to a *nearly white* substance, having the composition $C_{11} H_4 O_5$ (this formula being interpreted according to the view of atomic proportions, which requires 12 as the combining weight of carbon). The action of dilute ammonia, by which it is gelatinised, and the result of exposure to heat, when an exceedingly light form of carbon is produced, are among the most striking characteristics of the new body.

The lecturer concluded by referring to the theoretical considerations enunciated during the progress of these researches, and drew a comparison between the properties, physical and allotropic conditions of the elements, carbon, boron, and silicon, as brought to light by recent discoveries in this direction.

COMPARATIVE EXPERIMENTS OF SOME OF THE DRY PROCESSES.

BY MR. A. KEENE.

THE following abstract of the discussion that took place among the members of the Charlton-upon-Medlock Society, after the paper sent by Mr. Draffin "On the Comparative Experiments on some of the Dry Processes" had been read by the Chairman, may materially alter the opinion of the relative value of the processes intended to be conveyed by it.

The Chairman invited discussion, which he said must be short, as the time of the meeting was so far advanced.

Mr. Hooper was sorry to differ with an old friend, but he thought Mr. Draffin was wrong in stating that Taupenot's process was more sensitive than Fothergill's. He also could work both processes, and must be allowed to say that he found Fothergill's the better also for other reasons; and *submitted that the prints by Mr Draffin proved it*, particularly the View of York; *the Fothergill side was full of detail and half-tone;* the Taupenot side was without detail in the foreground, whilst the development had been carried so far that the distance was fading away.

Mr. Fawcett always found Taupenot's plate less sensitive than Fothergill's, but much easier to manipulate. The more you washed it the better it was, but he could never get it in the camera as quickly as Fothergill's.

Mr. Rogerson brought two negatives and some prints, the first production of an amateur who had just commenced Fothergill's process, to show what could be done at once by it.

In addition to the above, which need no comment, and are fully borne out not only by my own experience, but by that of numbers of others whose communications I have now by me, I would draw attention to a few apparent discrepancies; in Mr. Draffin's prior communication on the same subject, we are informed he purchased the Fothergill process plates *ready prepared;* in the present one, we are led to infer that they were prepared by himself in the various most approved ways; again, at the commencement of the present paper, it is stated that all three processes—Fothergill, Taupenot, and Hill Norris—are exceedingly good, and especially so for out-door practice; in fact, for this purpose, there is little to choose between them when properly manipulated; in the comparative experiments given, under these circumstances, the impression is conveyed that the Fothergill not only required

nearly double the exposure, but that the results were even then inferior. Are we here to conclude manipulation defective?

The lecturer, in reciting the advantages of the Taupenot process, mentions that eighteen plates may be prepared in an hour, but forgets to state they are only *half* prepared, and require, before being ready for use in the camera, a second immersion in the sensitising bath, a second washing, drying, and baking. Again, referring to the advantages they offer to those going long journeys, from the fact that they keep when *unsensitised* for an almost indefinite period, and do not suffer injury from exposure to light, he omits to notice the very important fact that, before they can be used, an immersion in the sensitising bath, as well as thorough washing, drying, &c., are necessary, necessitating either taking the bath solution or preparing it—not an easy matter always when on a tour, nor is it easy to obtain conveniences for washing, drying, &c.—nor a developing solution to develop, &c.; in fact, the whole paraphernalia requisite for wet process excepting collodion is difficult to procure.

The lecturer states that, for the Taupenot process, there need be no running about for a particular collodion, for any kind will do; his experience here certainly differs from that of most others who have found, at the cost of not a few failures, that it must be a short, powdery, non-contractile kind, or the picture will be covered with blisters; this kind, as is well known, does not answer for the wet process, as it gives no middle tone, but blacks and whites; here I maintain the Fothergill process has a decided advantage, the collodion that answers best for it being equally good for the wet process; it also has an advantage in its keeping properties—compared with a sensitised Taupenot—also in preparing for ease, shortness of time, and small quantity of water required—the latter, at times, no little advantage—as well as shortness of time occupied in developing, instead of, as in Taupenot, requiring sensitising, well washing, carefully coating with albumen to avoid air bubbles—certainly demanding as much attention as the use of the four drachms of water in Fothergill's process—drying and baking, again sensitising, washing, drying (and baking *optional*). We have in Fothergill's process, a sensitising, diluting bath on surface of plate with a measured quantity of water, coating with albumen, washing, drying (and film drying with artificial heat *optional*).

We have had published evidence that Fothergill's plates have kept two months in the warm weather, and I have myself had evidence of their keeping uninjured respectively from October till March, and September till April.

I should be sorry in any way to infer that Mr. Draffin is not acting *bonâ fide*, or does not really believe what he states of the processes; but, with the evidence before us, we can certainly draw no other conclusion, but that he has either operated upon badly-prepared plates, spoilt them by *over*-exposure, or is so biased in favour of his favourite process, that he cannot—as in the case of the View of York, mentioned by his friend Mr. Hooper—appreciate the superiority of the Fothergill process.

A METHOD OF OBTAINING PURE SILVERY WHITES IN COLLODION POSITIVES.

BY MM. DAVANNE AND JOUET.

COLLODION positives do not always present the metallic silvery whiteness that operators desire; the tint being often more or less dingy and dark, and far from presenting the desired appearance. In some experiments, we have obtained positives which have appeared to us to be more brilliant than the generality of those obtained in the ordinary way; the process, however, presents no new points; it consists merely in the addition of a certain quantity of sulphuric acid to the iron bath, and therefore is similar to a host of formulæ already published. If, therefore, we have obtained superior results, it arises from our having based our formula on the elementary laws of chemistry, instead of employing an empirical formula.

In order to obtain a brilliant metallic white it is necessary that the molecule of silver which is deposited to form the image should be as pure as possible; what, therefore, takes place when we develop a picture?

The oxide of silver in the nitrate is decomposed by the sulphate of protoxide of iron, and whilst the silver is reduced to the metallic state, the sulphate of the protoxide becomes sulphate of the peroxide. But the sulphate of the peroxide of iron, which is thus formed, is basic and insoluble; it consequently *envelops*, so to speak, the molecule of silver which deposits at the same time with it, and communicates to it a part of its ochery tint. Instead of an insoluble basic sulphate of the peroxide of iron, it is, therefore, necessary to obtain a neutral sulphate which is soluble in water; but this latter can only be formed if a certain quantity of sulphuric acid be added to the bath of iron. It is easy to determine the exact quantity necessary to add to the bath in order to produce a brilliant silvery surface, by the following formula, which indicates all the stages of the reaction:—$2\,(Fe\,O.\,SO_3) + Ag\,O.\,NO_5 = Ag + NO_5 + Fe_2\,O_3.\,2\,SO_3$.

The composition of soluble sulphate of peroxide of iron being $Fe_2\,O_3.\,3\,SO_3$, it will be seen that one equivalent of sulphuric acid must be added for every two equivalents of sulphate of protoxide of iron, or in weight 6·12 grains of sulphuric acid for 26·87 grains of crystallised sulphate of protoxide of iron.

In practice, and in order to use round numbers, it may be said in a general way that the quantity of sulphuric acid should be one-fourth of the weight of the sulphate of protoxide of iron employed.

The following is the formula we have used:—

Common water	200	parts.
Alcohol	10	"
Acetic acid	10	"
Crystallised sulphate of iron	4	"
Sulphuric acid	1	"

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued)*.

Backgrounds.—Continue as much as possible to make the background recede, that the face may come well out. All greys and browns recede; all warm colours—reds, yellows, &c., come out. Any very impressive colour in the background, or any striking object, acts contrary to what is intended, by forcing itself upon the eye and attention; in fact, every part of a picture should be made subservient to the effect of the figure: and none of the accessories should be made so impressive as to be seen before the principal object—*the head.*

A background should be made to assist the artist in producing a certain picturesqueness of effect, by means of light and shade; in those parts, where, to produce relief in one part, it is necessary to sink in another, there shadow is necessary. When, on the contrary, that part which is intended to come out tells strongly against some light introduced in the background behind, a fine effect is produced.

Where, in reference to the colour, you wish to develop a figure having, for instance, a warm complexion, with drapery composed of bright red, yellow, or the like, you will find the greatest amount of relief result from a bluish sky; still, have no crude blue, but rather let every object, every tint of colour intended to recede, which all are, more or less, in backgrounds, be softened into a greyish hue. For a warm complexion, some degrees of olive are suitable; yet this should not be crude, but rather softened with a warm grey or brown.

When the background is defective in the photograph, having marks, &c., resulting from a defective negative, a little of some opaque or body colour may be used; lay on the colour thinly, and finish with transparent colours; always observing, as a principle, that the under colours should be grey; a background, like most other passages

in a picture, may be made to appear more racy and effective by working warm colours over grey ones.

But, glaring red curtains, painted up to the highest pitch of gaudiness, with blue skies, as bright and strong in colour as ultramarine will make them, are all in bad vulgar taste, and no more conduce to the effectiveness of a picture painted according to nature in other respects, than a screeching blast, blown by some bad player, from a horn, would contribute to the beauty of a chord in music.

A picture, whatever the subject, should possess the leading attributes of brilliancy, richness, harmony, softness, and tone. Brilliancy is the purity of each colour, without crudeness; richness, the representation of colours made mellow; softness, the nice gradation of the degrees of colour, light and shade; harmony, the arrangement of colours by the side of each other, so that they shall one seem to assimilate with the other, and that, however opposite in their natures, they may appear to be lighted by the same source, and belonging to the same piece; whilst tone is that quality which gives to a work a decided nature—as for instance, some pictures are said to be of a "pale tone," some of a "rich tone," others of a "mellow tone," some of a "deep tone," so that a picture wherein every object was imbued with mellow browns in their shadows, and mellow, creamy yellow lights, would be considered of a "fine warm tone" as to colour, and as to light and shade, when the same principles were used in the just arrangement and gradation of lights and shadows.

It is necessary to make this clearly intelligible, that the student run not into a common fault of painting various objects in one work too crudely; for although, by contrast, every object may appear to possess only its own colour, *it is, nevertheless, so affected by surrounding objects reflecting their colours upon it, and all receiving one general tone from the general nature of the place wherein they are situated, as, to a certain extent, to partake of some of each other's colours*, so that painters, to represent this effect, have, some of them, especially the old masters, a practice of painting their pictures often in brown and white alone, embodying therein the different local colours; and as local colours are represented in the intermediate spaces between light and shade, both all the high lights, and all the deep shadows, are of one uniform colour, which produces a wonderful tone. This principle is variously applied; by Rembrandt, perhaps, with perfect success.

It will be evident, upon experiment, how much of the charm in old pictures is due to this; for, although time has evidently aided in producing the same effect, they bear witness to this principle having been much known and practised.

We have seen pictures by the old masters, wherein it was found, upon removing the rich outer coat of glazing, that they had been painted entirely with brown and white, and the local colours laid on afterwards (more strength being given in the half tints than elsewhere) in a transparent medium. This was entirely the process with respect to some draperies, the intense shadows being glazed afterwards with asphaltum. To apply these observations to our present purpose, let the brightest lights and deepest shadows partake of a similarity of colour. In some pictures by our best miniature painters, there is as much tone as in any oil painting. In some very fine ones, remarkable for brilliancy of colour, the shadows are of a yellowish-brown, even the shadows of blue drapery, the lights being made of yellow, red, and white.

But those who would prove the truth of this important principle, should place a picture thus treated by the side of one wherein the local colour is carried throughout objects, where the effect is dead and heavy. All appears dark on account of the imperfect imitation of the effects produced by light. The effect is dead and heavy. The shadows vary from the lights in nothing but depth, and seem to have the same colour intensified; the lights, too, are equally crude. Every object in such a picture will appear as though it had been steeped in a dye trough, and as if no light had ever shone upon it. Whilst the other picture steals upon the eye in soft harmony, as steal melodious sounds in rich concord upon the ear.

And, moreover, as so much of the picture is subdued, what real colour there is will appear to greater advantage, than if gaudiness and crudeness pervaded throughout.

There are painters so ignorant of or opposed to this method of treating a painting, that in representing a piece of (say, blue) drapery, they make it light blue in the lights, darker blue in the half tints, and in deep shade the deepest blue they can make it.

It is often found that such coarse treatment arises from a corresponding want of nice feeling on the part of the painter, coupled with an incapacity to see delicate effects of colour; for no man is expected to represent that which he does not see.

(To be continued.)

Dictionary of Photography.

Citrate of Soda is frequently used in photography. It may be prepared by saturating carbonate of soda with citric acid, and evaporating to the crystallising point. On the small scale, it may be very conveniently prepared by dissolving 112 grains of pure citric acid and 133 grains of pure dry bicarbonate of soda in a little water.

Citrate of Silver falls down as a white insoluble powder, when a soluble citrate is mixed with solution of nitrate of silver. This salt is of interest to photographic chemists, as forming the starting point in the preparation of the curious but little studied salts of suboxide of silver. If dry citrate of silver be heated to the boiling point of water, and a current of dry hydrogen gas be at the same time passed over it, it becomes partially reduced, and a brown powder is formed, which, according to Wöhler, is a citrate of suboxide of silver. This salt dissolves in water, forming a red solution, from which other sub-compounds of silver may be formed. It is on account of this remarkable re-action that Mr. Hardwich was led to the employment of citric acid in the ordinary processes of photography. Our correspondent, Θ, gave, in our second volume, p. 49, a very excellent negative printing process in which citrate of soda was used; and the addition of the same salt to the ordinary alkaline chloride used in the preparation of the "salting bath" in the positive printing process, is, by some, considered a great improvement. Mr. Hardwich has also recently introduced this salt into the toning bath; he takes—

Terchloride of gold	1 grain.
Sesquicarbonate of soda	1 drachm.
Citric acid	20 grains.
Water	12 ounces.

This bath will not keep long when mixed, and is very complicated in its employment; it being necessary to use it at a certain temperature, and allow the process to proceed whilst the metallic gold is in the act of being precipitated from the solution by the reducing agency of the organic acid present. Doubtless, in the hands of a very skilful and experienced manipulator, this process is capable of yielding excellent results; but, judging from the numerous specimens which we have seen of its action in the hands of an amateur, we are inclined to recommend the process given by Maxwell Lyte in the "Photographic News," vol. i. p. 301.

Collodion.—This name is given to a solution of gun cotton in ether. By the evaporation of the solvent, the gun cotton is left behind in the form of a tough transparent skin, insoluble in water. It was originally employed to pour over wounds, &c., in order to form an artificial skin to protect them from contact with the air: it was, however, soon applied to photography. Like albumen, it gives an insoluble film, which serves as a support for the sensitive material. The characteristics of a good collodion, for photographic purposes, should be the following:—It should be

sufficiently fluid to flow readily and freely over the plate, and in it should be dissolved iodide of potassium, ammonium, or cadmium, &c., in such quantity as to produce, by double decomposition with the nitrate of silver in the bath, a thin layer of iodide of silver. If there be too much iodide, the film comes off very easily; if, on the contrary, there is not sufficient, the sensitiveness is impaired: knowing this, it will not be difficult to arrive at the proper medium. In order to avoid spots, it is imperatively necessary that the collodion should be absolutely free from floating particles; the best way of effecting this is, to keep it in a large bottle, and every morning carefully decant the upper portion into an absolutely clean bottle for use. At the end of the day, the portion unused should be poured into another bottle, from which it may, as it gets full, be again decanted for use. *Iodised* collodion will not, generally, preserve its sensitiveness unimpaired for any length of time; it seems to alter in proportion as the iodide itself is easily decomposed. The reasons for this decomposition are, as yet, but very imperfectly understood, although they have been carefully investigated by many clever chemists, amongst whom, Mr. Hardwich, perhaps, stands foremost.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *May* 24, 1859.

WE have concluded our remarks upon the Paris Exhibition of Photographs; but in the course of our weekly notices we shall doubtless have occasion to refer again to many of its minor details.

It will be seen from our preceding letters on this subject, that the eminent photographers of the day whose works are exhibited here, may be classed in different categories according to their peculiar style of art. Thus, for *landscapes* we have Messrs. Roger Fenton, Braun, Morgan, Margantin (who has exhibited the most beautiful study of an elm tree we ever remember to have seen), Maxwell Lyte, Civiale, D'Aguado, &c. *Geographical proofs*, views of cities, &c., form the bulk of the collections exhibited by Messrs. Graham, Stahl, De Campigneulles, &c., whilst the *monumental style* has been adopted by MM. Bisson, Baldus, Dr. Lorent, Naya, and others. Some photographers appear to devote their art entirely to the *reproduction of pictures or engravings;* such are Messrs. Bingham, Caldesi, and Montecchi, Fierlants, and Bilordeaux; whilst *portraiture* is represented by MM. Nadar, Warnod, Legray, Pesme and Varin, and Salomon.

MM. Nachet, Bertsch, and Bernard have adopted *microscopic photography*—that is, the production of magnified proofs of minute natural objects—as their style. Messrs. Pouncey, De Beauregard, Salmon, and Garnier, and a few others are devoted to what we may term *experimental photography;* and under this denomination we may class the works of those artists who endeavour to apply photography to the useful arts. M. Dufresne, for instance, has been very successful in this way. He has exhibited a large steel shield, most admirably engraved by heliographic means; Madame Laffon's screens, spoken of in our last letter, are another instance.

In original subjects, or what we term *photographie de genre*, Mr. Robinson stands decidedly foremost. We feel the want here of Mr. Rejlander's proofs. He has not exhibited. M. Alophe, of Paris, has replaced him, at least in one of his proofs which he calls "La Gloire et le Pot-au-feu." It represents a young painter in his studio. He is seated, with a clay pipe in his mouth, before his canvas, from which he has turned for an instant to observe the progress of his dinner, cooking on the stove beside him. In one hand he holds his pallet and brushes, whilst the other is employed to raise the lid of a saucepan in which the soup is boiling. This proof is taken from nature.

The *Société Française de Photographie* has just published its report, read at the last meeting by M. Perier, on the Duc de Luynes' prize. We have already informed our readers of the final result of this report, which awards a certain portion of the prize to MM. Poitevin, Pouncey, Garnier and Salmon, and Davanne and Girard. It will, perhaps, be interesting to take an historical glance at the processes presented to the Society, with a view of obtaining the desired end, *i.e.*, the production of unalterable positives.

In September, 1855, M. Jobard, of Dijon, presented a paper on a new manner of rendering proofs indestructible, but his process in which freshly prepared hyposulphite, the use of salts of gold, of bromide of iodine (to produce lights), solutions of iodide and bromide of potassum, are recommended, is not essentially new.

In December, 1855, MM. Rousseau and Mousson recommended the use of bichromate of ammonia mixed with gum and sugar; after exposure, the proof is treated with gallic acid or pyrogallic acid, and is then submitted to the action of certain metallic salts, according to the colour or tone which it is desired to produce. But this process, which consists of twelve or thirteen complicated operations, is very uncertain in its results, and appears to have been abandoned by the authors.

In October, 1856, M. Chambard proposed a sort of gelatine varnish to cover the positives; but this being a purely mechanical means of preservation, could not be admitted to compete for the prize.

In November, 1856, the Society received a communication from M. Homolatsch, of Vienna; the process he proposed was founded on one already made known in 1851, by M. Bayard. The proofs formed on a layer of chloride of silver, are afterwards treated by gallic acid. It appears that M. Homolatsch's process does not fulfil the required conditions.

The fifth competitor is Mr. John Walsh, of London; "the application of his process," says the report, "is limited to positives on glass, and offers nothing new."

In 1857, M. Blanquart Evrard, of Lille, proposed a sort of varnish consisting of gelatine and tannic acid. But this, like the process proposed by M. Chambard, is purely mechanical, and it is required that the competitors should resort to chemical means also.

In March, 1857, M. Jean Schaëffer, of Frankfort-on-the-Maine, describes the use of Fordes and Gelis' salt of gold, stiffening by gelatine, and the application of Schœnée's varnish; but all this was known and practised before by many photographers.

M. Violin, who comes next, proposes that the proofs shall be produced on a layer of salted collodion, previously transferred to paper; but this process, which is not altogether new, did not appear to produce the required permanence of positive proofs.

In July, 1858, M. Gaumé comes forward with a completely new operation. A solution of gutta-percha in benzoin is made. The clear portion of the liquid is poured off—a fine granular residue is left. This is melted and the new paper plunged into it. This preparation of the pure paper gives it a certain impermeability, which seems to prevent the decomposition of the organic matter, and thus it may prove very useful; but the process does not appear to the commission to have any claims on the prize.

Such are the rejected candidates. The rest of the report is dedicated to the discussion of the process imagined by MM. Testud de Beauregard, Poitevin, Pouncey, and Garnier and Salmon; these four candidates for the prize having presented to the Society specimens of a new and important process.

The commission first proceeded to examine the experiments made by M. Beauregard in 1855. The process proved very long, and the result very unsatisfactory, although M. de Beauregard himself was present to superintend the manipulations. MM. Garnier and Salmon's process was next tried: 30 parts of white sugar are dissolved in 30 of water; to this are added 7½ of bichromate of am-

monia, bruised in a mortar, and 10 of albumen. The whole, well mixed, is passed through a piece of linen, and applied upon the paper by means of a brush. The sheet is dried by the fire and put into the camera. After a quarter of an hour's exposure the whole proof is covered with ivory-black, and after having been warmed a little at the fire, it is placed carefully in water, the image downwards. "In Pouncy's method," says the report, "the manipulations are rather more simple."

The remainder of this report is devoted to the claims of M. Poitevin as having been the first (in 1855) to give the idea of the carbon process, and to the merits of certain photographic researches by MM. Davanne and Girard. The prize of 2,000 francs, as we stated some weeks ago, has been divided between Messrs. Poitevin, Pouncey, Garnier and Salmon, and Davanne and Girard. The competition for the remainder of the Duc de Luynes' prize is open for three years more.

M. Chambard, whose name we have mentioned above, has lately addressed a short note to the *Academy of Sciences* here, in which he endeavours to prove that the effects observed in M. Nièpce de St. Victor's tubes are to be attributed not to light or to heat, but to electricity. Our readers will already have seen in the "PHOTOGRAPHIC NEWS" a paper by two young French chemists, MM. Bouilhon and Sauvage, who attribute these effects to a peculiar volatile body which is formed when certain salts or acids act upon organic substances, but of which nothing is known. Baron Paul Thenard attributes these effects to the active condition of oxygen known as ozone. As early as 1856, Dr. Phipson proved that many organic substances, when combining with oxygen, transform the latter into ozone; and he stated expressly that light appeared to facilitate the production of ozone in these circumstances.

On the 22nd of March last, a most violent earthquake shook to their very foundations the chain of the Andes near Chimborazo. The shock lasted five whole minutes, and its effects were felt simultaneously in a great number of towns. At Quito, all the churches, monasteries, palaces, &c. &c., are one mass of ruins. The loss is immense, and the number of victims more than 2,000! M. Boussingault, to whom we owe this sad news, received it from an eye-witness, who, on rushing out of a small chapel situated on an eminence, saw an immense cloud of dust rise into the air. It was the town of Quito which was being shaken to ruins! This fine capital, of 70,000 inhabitants, was almost entirely built of stone, on account of the proximity of the active volcano Pinchincha, which was looked upon as a sort of safety valve, and as rendering earthquakes less formidable—although their phenomena have always been very frequent there. In the more prudent towns of Poupaya and Guyaquill, however, all the edifices are of wood.

The Emperor of the French has ordered a statue to be raised at Versailles to the memory of Alexander von Humboldt.

We extract the following curious experiment from an interesting pamphlet lately published by Professor Nicklès, of Nancy, and containing an account of the last meeting of German naturalists at Carlsruhe. It is well known that iron which is obtained in an extremely fine powder by reducing oxide of iron by hydrogen gas at a high temperature, has so great an affinity for oxygen that, if properly prepared, it takes fire spontaneously in the air and burns with a vivid light. A manufactory has lately been established in the Tyrol to obtain iron powder—principally for medicinal purposes—by mechanical means, *i.e.*, by the aid of very fine files. This iron will not take fire by exposure to air, but it is, nevertheless, very combustible, as M. Magnus has lately shown. If a lighted match be approached to it, it will not take fire; but if the metallic powder be previously attached to the poles of a magnet, and then lighted, it will burn vividly.

To make this experiment, a common magnet is plunged into the iron powder; a certain quantity remains suspended from the poles of the magnet; a light is then applied, when the iron takes fire easily, and all burns away.

M. Nicklès assures us that this peculiar property appears more or less limited to iron prepared in the Tyrol. He has tried the experiment with other species of iron-powder with only partial success. The above experiment caused much sensation at the Carlsruhe meeting.

Photographic Societies.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

THE seventeenth ordinary meeting of this Society was held on May 16th, at the Golf Club House, the President, J. Glashier, Esq., F.R.S., in the chair.

The usual business having been transacted, Messrs. Chatteris, C. Busk, and Dr. Kidd, were duly elected members of the Society. The President then proceeded to read a paper on "The application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich,"—a continuation of that read before the Society on the 21st March last. Having described and exhibited diagrams of the apparatus by which a ray of light from a small lamp is concentrated upon the sensitive paper, inclosed in a glass cylinder, kept revolving at an uniform rate by a chronometer, by means of a mirror fixed upon the magnet (which has free horizontal motion) by a stirrup; the nature of the curves registered by the deflection of the magnet, and the mode of calculating their value from a base line, was described,—the lecturer adverting to the so-called "magnetic storms," and showing that they were synchronous at the various parts of the globe where such observations are recorded. He then described the—

CHEMICAL PROCESSES EMPLOYED IN THE PHOTOGRAPHIC OPERATIONS FOR THE SELF-REGISTRATION OF THE VARIATIONS IN POSITION OF MAGNETICAL, AND OF THE VARIATIONS OF READINGS IN METEOROLOGICAL INSTRUMENTS.

First Operation: *Preliminary Preparation of the Paper.*—The chemical solutions used in this process are the following:—

(1) 16 grains of iodide of potassium are dissolved in one ounce of distilled water.

(2) 24 grains of bromide of potassium are dissolved in an ounce of distilled water.

(3) When the crystals are dissolved, the two solutions are mixed together, forming the iodising solution. The mixture will keep any length of time. Immediately before use it is filtered through filtering paper.

A quantity of paper sufficient for the consumption of some little time, is treated in the following manner, sheet after sheet:

The sheet of paper is placed upon a board, covered with oil-cloth somewhat smaller on all sides than the paper, a condition necessary for preventing the iodising solution from running under the edges of the paper.

The paper is usually pinned on the left side of the board. A sufficient quantity (about 50 minims for a sheet of paper 15 inches long, and 9½ inches broad) of the iodised solution is applied by pouring it upon the paper in front of a glass rod, which is then moved to and fro, till the whole surface is uniformly wetted by the solution.

The paper thus prepared is allowed to remain in a horizontal position for a few minutes, and is then hung up to dry in the air; when dry, it is placed in a drawer till used.

Second Operation: *Rendering the Paper sensitive to the Action of Light.*—A solution of nitrate of silver is prepared by dissolving 50 grains of crystallised nitrate of silver in an ounce of distilled water, adding in hot weather a few drops of acetic acid.

Then the following operation is performed in a room illuminated by yellow light.

The paper is prepared, as before, upon a board somewhat smaller than itself, and (by means of a glass rod, as before) its surface is wetted with 50 minims of the solution.

It is allowed to remain a short time in a horizontal position, and if any part of the paper still shines from the presence of a part of the solution unabsorbed into its texture, the superfluous fluid is taken off by the application of blotting paper.

The paper, still damp, is immediately placed upon the interior glass cylinder and is covered by the exterior glass cylinder, and is mounted upon the revolving apparatus to receive the slit of light formed by the mirror, which is carried by the magnet.

Third Operation: *Development of the Photographic Trace.*—When the paper is removed from the cylinder, it is placed upon a board, and a saturated solution of gallic acid, to which a few drops of acetic-nitrate of silver are added (in hot weather this solution is used at the temperature of the air, in cold weather it is heated to the temperature of 70° or 80°), is spread over the paper by means of a glass rod, and this action is continued until the trace is fully developed.

When the trace is well developed, the paper is placed in a vessel of water, and repeatedly washed with several successive supplies of water; a brush being passed lightly over both sides of the paper to remove any crystalline deposit.

Fourth Operation: *Fixing the Photographic Trace.*—The photograph is placed in a solution of hyposulphite of soda, made by dissolving four or five ounces of the hyposulphite in a pint of water; it is plunged completely in the liquid, and allowed to remain from one to four hours, until the yellow tint of the iodide is removed. After this the sheet is washed repeatedly with water, and afterwards placed within the folds of linen cloths till nearly dry. Finally it is placed between sheets of blotting paper and a heated iron is passed over it.

CHEMICAL PREPARATIONS AND TREATMENT OF THE PHOTOGRAPHIC PAPERS FOR NEGATIVES.

First Operation: *Preliminary Preparations of the Paper.*—The chemical solution required for this purpose is as follows:—

Two grains of chloride of ammonium are dissolved in one ounce of distilled water.

A sufficient quantity of this solution is placed in a flat porcelain dish, and sheets of paper, one by one, are plunged within it, care being taken that no air bubbles remain between the paper and the solution; this may be prevented by slight pressure over the sheet by means of a bent glass rod. When a few sheets are thus immersed, they are turned over in a mass, and are taken out one by one and hung up to dry.

An equally good result is obtained by spreading over one side, by means of a glass rod, as in the preparation before described, a solution of chloride of ammonia made by dissolving five grains in one ounce of distilled water.

Second Operation: *Rendering the Paper sensitive to the Action of Light.*—The solution required for this purpose is as follows:—To a filtered solution of crystallised nitrate of silver (made by dissolving 50 grains of nitrate of silver in one ounce of distilled water), some strong solution of ammonia is added; the whole becomes at first of a dark brown colour, but when a sufficient quantity of ammonia is added, the solution becomes perfectly clear; a few crystals of nitrate of silver are then added till the solution is a little dull; it is then ready for use.

The following operation is performed in a room illuminated by yellow light:—

By means of a glass rod this solution is spread over the paper, whilst pinned on a board; the paper is dried before a fire, and is then in a fit state to be used for producing a negative.

Third Operation: *Formation of the Photographic Negative.*—A sheet of the paper so prepared is placed upon a bed made of flannel and blotting paper, resting on a sheet of plate glass with its prepared side upwards. The original photograph is then placed on the paper with its own face downwards, and as it is necessary for obtaining a correct copy of the original, that it should be in close contact with the prepared surface; a second sheet of plate glass is placed over it, and the two are pressed together by clamps and screws, or the photograph and sheet of paper are placed in an siding printing press, and pressed together by its arrangements. The whole is then exposed to the light (the original to be copied being above the paper on which the copy is to be made). The time required to produce a negative depends, in a great measure, upon the thickness of the paper on which the original is made, and on the actinic quality of the light; a period of five minutes in a bright sunshine, or an hour in a clear daylight, is generally sufficient.

Fourth Operation: *Fixing the Photographic Negative.*—When an impression has been thus obtained, it is necessary that the undecomposed salts of silver remaining in the paper be removed.

For this purpose, the negative is at once plunged in water and kept moving, a brush being passed over both sides. It is then immersed in a solution of hyposulphite of soda (made by dissolving two or three ounces of the hyposulphite in a pint of water), and is left through a period varying from half an hour to several hours.

It is then removed and washed in plain water several times, and running water is allowed to pass over it for 24 hours. The sheets are then placed within the folds of drying cloths, till nearly dry, and finally ironed between sheets of blotting paper.

The process of obtaining copies of the originals from the negatives, is in every respect the same as that of obtaining a negative from the original.

At the conclusion of the paper, Mr. Heisch remarked that the proportion of bromide to iodide of potassium used in sensitising the paper, was as nearly as possible 2 atoms of bromide to 1 of iodide.

A vote of thanks was then unanimously tendered to Mr. Glashier for his able and interesting paper; and Messrs. Kent, Crossland, Kieser, and Skaife, having been proposed as candidates for future election, the meeting adjourned.

The following report of the council has been circulated among the members:—

SECOND ANNUAL REPORT OF THE COUNCIL.

THE lapse of another year brings round the second anniversary of the Blackheath Photographic Society, and the Council have the pleasure of presenting their second annual report.

The Council heartily congratulate the Society upon its present prosperous condition.

During the past year the Society's numbers have been recruited by the introduction of many of the influential residents in the neighbourhood, several practical photographers—and all zealous to promote the art of photography.

The treasurer's account is annexed, exhibiting a balance of £49 11s. 2d. in favour of the Society.

The *soirée*, which was held at the Mansion House, by the kind permission of the Rt. Hon. the Lord Mayor, on Friday, the 15th April, was eminently successful; and the works of Messrs. Glaisher, Heisch, Melhuish, Knill, Ledger, Smith, Spencer, Wire, and Wood, were such as to elevate the character of the Society from which they emanated. The following gentlemen contributed also materially as exhibitors to the success of the Exhibition, viz.—Messrs. Bedford, Bell, Bunning, Burfield and Rouch, Claudet, Cumming, Delamotte, Fenton, Frith, Horne and Thornthwaite, Jones, Knight, Ladd, London Stereoscopic Company, Murray and Heath, Malone, Negretti and Zambra, Otterwill, Paul Pretsch, Powell and Leland, Pillischer, Rayne, Reeve, Rosling, Ross, Salmon, Shadbolt, Smith and Beck, Thurston, Thompson, Turner, White, Williams, E. G. Wood, and Herbert Watkins; to each of these gentlemen the Council beg to render their warm acknowledgments.

Through the continued kindness of the Golf Club, the meetings of the Society have taken place during the past session at the Golf Club House; the Council therefore offer their best thanks to the officers of the club for affording them a *locus standi*.

The following brief list of papers, read during the session, will show the energy and intellect which have been exercised on behalf of the Society by some of its leading members; and it is pleasing to record the fact that the journals specially devoted to photography, and some of the local newspapers, have given a preference to many of the Society's papers in their publications, and by making them the subject of favourable criticism have demonstrated their original and instructive character. The Council have to acknowledge, with many thanks, the great, nay, the special courtesy shown them by the press generally, and particularly by the editors of the local press, who have not unfrequently, during an unusual pressure of business, given insertions to, and notice of, the transactions of the Society.

The following is a list of papers read during the session:—

"On the Simultaneous Photography of various Coloured Objects." By Mr Heisch.

"A Week with the Camera among the Hills of Kent." By Mr. Wire.

"On Nautical Photography." By Mr. Skaife, showing his "instantaneous method" of taking photographs.

"On two main points in Photography." From Herr Paul Pretsch, read by the president; and, from the same source, a paper on Pretsch's "Photogalvanographic Process."

"On Metagelatine as a substance for mounting Photographs." By Mr. Heisch.

"On the Dry Collodion Process." By Mr. Heisch.

"On the Application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich." By Mr. Glashier.

The Council regret that so few strictly scientific researches have this year to be reported, as from these only, can fundamental improvement be expected. M. Niépce de St. Victor continues his experiments upon the so-called storing up of light. Without absolutely ignoring his facts, a careful examination of his experiments, as reported by himself, convinces the Council that they by no means justify the theory he has raised on them. The fact, that the bodies

supposed to contain the bottled light exercise their reducing action only through porous substances, such as paper, and have no action through glass or other non-porous substances, however transparent, while the reducing action of light passes most easily through transparent bodies, quite independently of their porosity,—coupled with the admission of M. Niépce, that heat, vapour of water, and anything which favours the passage of vapours through such substances as paper, materially assist, if indeed they be not essential to, the supposed new action—render it more than doubtful if light have anything to do with the matter. It is also worthy of remark, that none of those accustomed to scientific investigation, who have attempted to repeat his experiment, taking the most moderate precautions against self-deception, have ever succeeded; while Mr. Crookes has shown that at least one of his experiments is quite as successful with substances that have been kept rigorously in the dark. On the whole, the Council see no more reason for ascribing the effect produced by M. Niépce to light, than they do for attributing anastatic printing to the same agency, because the nitric acid employed in that process penetrates the white parts of the paper, and attacks the zinc plate beneath them, while it does not attack those parts which are covered by the ink. In another direction, however, M. Niépce's experiments seem to have led to more satisfactory results. He has added to the number of substances which receive an impression from light capable of after-development, and the Uranium Printing Process, founded on these experiments, promises to become of some importance. M. Chevreul, in an appendix to M. Niépce's last paper, points out the necessity of distinguishing between such substances as are acted on by light alone, and those which are only affected when oxygen is present; and gives a list of those substances on which light acts "in vacuo," of those on which it only acts in the presence of air, or of oxygen, or of those bodies in conjunction with moisture.

The Council must also bring under the notice of the Society, Mr. Pouncey's carbon printing process; for though they can by no means agree with him in his assertion that his prints are quite equal to silver ones, the immense strides he has made, in a comparatively short time, render his process one of great promise. At the same time, the Council cannot but remark, that the conclusion that the prints must be as permanent as those made with printers' ink, because in both carbon is the colouring matter employed, has been much too hastily arrived at, as it has yet to be proved that the glue and bichromate of potash employed as a vehicle, is as unalterable as the oil, resin, &c., which enter into the composition of printers' ink.

The discovery of Mr. J. H. Young, that the invisible image on a collodio-albumen plate can be developed, after the removal of the iodide of silver, by hyposulphate of soda or cyanide of potassium, is too important to be passed over without notice, showing, as it does, that the change produced in the iodide of silver by light is even greater than has hitherto been thought. At present it does not appear that he has produced any but transparent positives, printed from negatives by superposition; so it remains to be seen if the comparatively feeble light of the camera is capable of producing the same effect.

The Council would take the opportunity of reminding members, of the forms for the registration of observations with which they were last year furnished, none which appear, up to the present time, to have been filled up. They would press upon members the necessity for a little exertion on this point, as it is only by a comparison of a number of observations, made in different places and under various circumstances, that any good results can be hoped for. With a view to facilitate these observations, Mr. Heisch has prepared shorter forms, embodying only the most important points, and those which can most easily be attended to in the field.

The new forms of lenses are still exciting much discussion. The members have had some opportunity of judging of the results obtained with them at the late exhibition at Suffolk Street. The pictures by Mr. Bedford were mostly taken with a Grubb lens, those by the late Mr. Howlett, with a Ross Petzval.

The Society, since the publication of the last report, have to regret the loss of several members, from various causes, chiefly through removal from the neighbourhood, among whom should be specially noticed the name of G. Busk, Esq., F.R.S. The Council record the secession of such with regret. While acknowledging with thankfulness the labours of those members who, in the midst of important avocations, have kindly devoted their time to the production of papers for the intellectual gratification of the Society, the Council have to urge upon other members the necessity of contributing somewhat to its intellectual maintenance, recording their opinion that a failure in this particular presses somewhat unfairly upon those gentlemen who have already exerted themselves so much in that direction. In conclusion, the Council point with satisfaction to the position the Society has obtained in the public estimation, and venture to add that such combinations cannot fail to exert a beneficial influence upon the community at large, fostering, as they do, two important principles, viz., the extension of scientific information and original research, and the bringing together, for that result, those who are desirous of cultivating knowledge.

THE FRENCH PHOTOGRAPHIC SOCIETY.

THE chair was taken at the last meeting of the above Society by M. Regnault, the President.

After the names of the newly-elected members were read—

M. Signoret presented to the Society, in the name of M. Nachet, an apparatus for the production of small microscopic photographs.

In reply to an observation made by a member concerning the chemical focus, M. Signoret stated, that M. Nachet had not been able absolutely to eliminate it in these instruments, but that, by a few trials, the operator could easily determine its place.

MM. Davanne and Jođet read a note on a process for obtaining pure silvery whites on collodion positives. (See p. 135.)

M. Paul Perier read, in the name of the commission, the following report on the competition for the prize of 2,000 francs, offered by M. le Duc d'Albert de Luynes:—

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.

GENTLEMEN,—The commission constituted by you on the 16th July, 1858, for the purpose of examining the processes and proofs sent to compete for the second of the two prizes founded by the Duke de Luynes, has terminated its labours. It now renders you an account of them, and informs you of the decisions at which it has arrived, by virtue of the powers founded on the programme read at your meeting of the 16th July, 1856.

Before laying the progress and details of our labours before you, and announcing the names of the successful candidates, it is necessary to pause before a preliminary consideration of the highest importance; for it is impossible not to foresee—and hence it would be imprudent not to guard against—the abuse that some will not fail to make of what we might have the want of tact not to say, as they possibly will do of what we shall have the frankness to avow. Can we forget, in fact, that at the very moment when we occupied ourselves in considering the means of assuring to our proofs the character of permanency, a large portion of the public, hostile, indifferent, or badly informed, predicted a prompt and fatal destruction of our pictures? If, then, in following the line traced by the Duke de Luynes—in studying the conditions of permanency for the purpose of fulfilling them—we leave in obscurity the questions of possible duration, relative and probable, in the present state of the art, do we not create a risk of misunderstanding by some, and of malicious disparagement by others? Will not the conclusion be drawn, that the seeking of a method of assuring the permanency of future prints implies the confession, that those now in existence will inevitably fade away?

That is why, gentlemen, we desire to balance the evil we are bound to admit by the good we are enabled to affirm; and, neither making ourselves greater or less than we are, nor to exhibit any inward weakness, nor furnish a dishonourable weapon to the enemies of the art and the interests defended by our Society.

Now, when we consider the programme which actuates, explains, and determines the competition, we find therein nothing more or less than this:—

The establishment of the fact of the accidental alteration of a certain number of proofs.

Admission in theory, under certain conditions, of the possibility of alteration in all proofs whatever.

The great utility of researches tending to render every image, if not unalterable, at least as indelible as the products of printing, engraving, and lithography have been hitherto.

But the confession that our proofs, when properly treated, must necessarily and promptly fade, will nowhere be found. Let us repeat the textual expressions of this programme, as given by our President—a high authority in such a matter:—

" . . . . Before all things we should be assured of the indefinite preservation of the proofs. . . . Unfortunately, many proofs which have only been in existence a few years are, at the present moment, seriously altered—some, even, have completely disappeared. . . . Photographers have spared no pains in seeking for the causes of this rapid change. . . .

Photographic Societies have recorded for years past a large number of fixing processes, which their originators have presented as assuring the indefinite preservation of proofs. . . . They have been able to verify important improvements. . . . There is room to hope shortly for greater still. . . . But the indefinite preservation of proofs can only be ascertained by the experience of several generations. . . . The knowledge of the chemical and physical properties of bodies suggests objections, of which time alone can prove the exactness." (Here follows the theory of the eventual alterations, physical and chemical).

"Carbon is, of all substances that chemistry has brought to our knowledge, the most stable and unalterable. It is therefore evident, that if we could succeed in producing the blacks of the photographic design by carbon, we should have the same guarantee for the permanency of our proofs as for the permanency of our printed books, and that is the most we can either hope or desire."

Thus, gentlemen, you have understood it. Numerous instances of fading, or total disappearance, have been pointed out with regret; we acknowledge too the recent completion of good proofs that have remained perfectly intact; modest, and full of reserve, in the face of such recent traditions, we admit doubts, we pass in review possible accidents, we are loyally frank in multiplying them: but if we do as the man who exaggerates his defects and glosses over his good qualities, we do not go so far as to avow ourselves radically vicious; and no more than we arrogate to ourselves the right of affirming perpetual durability, do we allow any other person to affirm their undoubted destruction. Let us dare to add, now, that this modesty, that this laudable reserve, have, perhaps, been carried to excess, and that it is time to bring them back within juster limits.

That which the programme has not said—that which, it is true, it was not in a position to say three years ago—it is now our right and duty to declare. In the first place, the proofs that have faded partly or entirely out from the discovery of our art until the present day, have been for the most part badly treated, fixed, toned, or washed with negligence—infected, in a word, by the operator himself, at some point of their production; or, in hands otherwise careful, they have been produced, either by following methods which science had already pronounced to be wrong, or by others current at the time through the ignorance of rational and sound processes.

In the second place, conscientious and intelligent photographers can show a certain number of proofs embracing all the dates that have elapsed since the discovery of photography, which present such brilliancy, force, intensity, and delicacy of tone as to warrant the inference that they are entirely unchanged from their original condition.

These are isolated facts, it will be said—exceptional cases. Granted that they are so, still they are conclusive, and are sufficient to condemn the violence of our detractors.

If, now, from these isolated facts we desire to form a theory of complete security, we should, to a certain extent, be authorised therein by recent and valuable researches which have arisen to confirm hopes, previously supported on bases of empiricism alone.

This is the place to recall a new detail which corroborates our reservations. The programme of 1856 was so far from making cheap work of acquired processes, it so little abandoned their cause, that, placing itself, on the contrary, in the hypothesis of the maintenance of their continued—not to say exclusive—use, it proposed, as one of the conditions of the second of the prizes founded by the Duke de Luynes, a complete study of the different chemical and physical actions which intervene in the processes employed, or which influence the alteration of the proof. This was saying implicitly that the insufficiency of these processes was in no way demonstrated; that the imperfections of many of the results obtained, that the doubts avowed respecting the permanency of others, depended less on the scientific methods or their true theory, than on the obscurity which might still envelop them, and cover the rocks with its shadow.

To this appeal of the programme, gentlemen, you are already aware of the answer that has been given.

By throwing a new or more vivid light on so many of the causes of alteration, our colleagues have demonstrated, up to the extreme degree of probability which verges on certainty, that all of those causes which remain hidden must belong to one of the established categories; and in furnishing this sketch of the wrong paths followed by the first explorers they have prepared, at all events very approximately, the official map which will soon conduct us to our object by the shortest and most certain road.

The more general use during the past three years of sel d'or for toning, the excellent modifications that have been made in this process, sanctioned by the beautiful results that have ensued, powerfully concur in authorising this measure of confidence we entertain, and which we desire to communicate to others. There are few proofs now-a-days in the formation of which salts of gold do not intervene, with such variations in the formula as support the common principle; and until the day arrives when carbon-printing shall have shaken itself free of its youthful bonds, we are of opinion that it is necessary to attach ourselves more and more to auriferous baths, in which are found the best conditions of permanency.

We must once more recall to mind that the first guarantee of permanency is to be found in making it a rule to observe the most minute precautions, and using the most vigilant care, in the whole series of manipulations. Let us respect this rule; let us abstain—a thing easy enough in future—from formulæ and substances, from operations which photographic science has pointed out as being dangerous, and we may, we and our works, brave the menaces of time.

Scrupulous care and precautions are the points on which photographers generally have been hitherto wanting; and from this cause have arisen the complaints of the public. It will not be without interest to pause here a moment, to show these imperfections are not inherent in the process, but are due to individual carelessness. The question is worth a little trouble, for the evil is as real in fact as its explanation in principle is easy and re-assuring.

If photography were nothing more than a pastime for idle people, or even if it were an art confined to a small number of products of a great price; if the rapidity of its progress had not in a short time made it the support of one of the most extending trades, and the source of large commercial undertakings, we could less easily understand that the works created by it had not always been under the best conditions. But what, on the contrary, is the source of the greater part of the photographs which the public see out of doors or in porfolios of collectors? It is most certainly the workshop of a photographer who, although an artist, is at the same time the head of a trading establishment, and upon whom the conditions of every trade to produce largely acts with greater force, because therein lies the *sine quâ non* of cheapness necessitated by competition.

Now, we believe we shall not hurt the feelings of any person, and we know how to make honourable exceptions, in saying that, in its early years especially, in the era of doubts and searches, either from error or carelessness, an enormous number of negligently prepared and defective proofs were sent out from these *ateliers*. It would answer no purpose to be silent on this point, since it is a fact averred and known by everybody. On the contrary, it is of the highest importance to remind all our *confrères*, that in this lies the real danger, and that it depends on them to lose the public confidence on which they depend, without a hope of getting it back again, or to regain it and keep it by applying the remedy which in this case is to be found beside the evil. Doubtless, it is not to be expected that the head of a photographic *atelier* can personally watch over the printing of each picture. He cannot, like the amateur, who calculates neither his time nor his outlay, paternally caress all his proofs one after the other. It is easily understood, therefore, that at the epoch when processes were not well devised, and when success required a series of minute and prolonged corrections, that the eye of the master being absent, the house suffered. But the difficulties, which each day tends to diminish, being now almost entirely vanquished, let us hope that hereafter they will listen more willingly to the voice of honour and interest, within as well as beyond our frontiers—for the plague from which we still suffer was infinitely more serious abroad. In celebrated cities and countries where the tourist is continually wandering, the reckless photographer, whose conduct deserves the strongest reprobation, delivered the traveller proofs, treated *en masse*, in such haste and under such conditions, that they could not have a longer life than the roses of the poet. On reaching the end of his wanderings, and once more by his own fireside, the enthusiastic amateur had nothing for it, when he

opened his portfolio, but to resign himself to the conviction that he had been victimised—

"Swearing, though a little too late,
They should not take him in again."

This, in fact, is the oath they must often make; and photography has not more reason to fear for her renown than her interest. The best means, nevertheless, of repairing the evil after having pointed it out, is not to allow of its being exaggerated, its causes distorted, nor to grant those who criticise us that which we ought to refuse them. The most exalted art cannot guarantee all artists against failure; neither can we flatter ourselves that in ours all those whose duty it is to do so, will consult the common advantage. It is probable that there will always be ephemeral and deceiving photographers; is that a reason for condemning permanent proofs? And is it not sufficient that the enlightened amateur can always find an able producer, and the prudent purchaser a conscientious vendor? There are detestable engravings, which it would be far better to see effaced instantaneously, than that they should exist permanently. Painting itself, and sculpture, count a hundred mediocrities for one *chef d'œuvre;* yet we admire these arts, without any thought of their unwholesome fecundity. Photography, in its humble sphere, will defend itself by its merits. She will rise from this redoubtable struggle, and triumph over those who refuse to believe in her attaining a green old age, as well as over those who would place her on a level with a mechanical automaton.

This long preamble is forced on us by the importance of the subject.

Ought we to fear that persons may deceive themselves as to the bearing of our words, and profess to find in them a contradiction with the very object of the report? We think not. One thing required is, the use of a new process which wants the consecration of time, even though we may have every reason to believe it excellent; another thing is the use of methods which authorise and confirm, by raising them above all doubts, a well founded confidence in the proof of centuries.

It is clear that convictions, and even the most plausible theories, have little weight beside the argument which calls itself *four* or *five hundred years*. Thus the chloride of silver, the chloride of gold, and their most complete reductions, are to printing ink that which the 19th century is to the 16th; even though one may seem to have the right of saying—*it is certain that I shall live*, the advantage will always be with that which can reply—*it is certain that I have lived.*

We will now commence by stating succinctly the system we adopted since our first meeting, for the purpose of making a definitive selection among the candidates.

Wishing to simplify the labour and to clear the ground at once, we resolved in the first place to eliminate the previously known processes, those which had no real bearing on, or direct connection with, the object proposed by the founder, and we reserved for a sub-committee, chosen from among ourselves, the care of submitting to complete and comparative experiments those which remained after this first degree of election.

In September of 1855, M. Jobard, of Dijon, caused a note to be presented to you relative to the fixing of positive proofs, which he conceived he had treated in a novel manner, and which he thought he had by that means rendered indestructible.

But the cause of alteration pointed out by him as unique having already been brought to light by MM. Davanne and Girard, the use of new hyposulphite, the colouring by the salts of gold, and even the use of bromine and iodine for cleaning when necessary, not belonging to M. Jobard, there remained nothing new in his process except the aqueous solution of iodide and bromide of potassium, as the first colouring agent, which could not constitute a serious title to the prize, however satisfactory in appearance and reality M. Jobard's proofs have remained hitherto.

On the 21st December, 1855, a process by MM. Rousseau and Masson was communicated to you, the applications of which are several. The first part, which concerns the printing on paper alone, enters into the category we have to consider this year. It is the first of those which will occupy us in this report, the principle of which was the use of bichromate of ammonia, mingled with an organic body—gum, and a saccharine matter. After exposure in the printing frame under a negative, and the washings, gallic and pyrogallic acids intervened; the final result was obtained by the successive action of different metallic salts, varied according to the tone or colour it was desired to produce; these tones or colours are declared by the author unalterable, as being formed by films of gallates or prussiates with metallic bases. We had no specimens; MM. Rousseau and Masson not having persevered in the application of their discovery after the presentation made by them. As to the practical hopes to be founded on its actual condition, it is sufficient for us to say, to justify our doubts, that the process requires no less than twelve operations in the most favourable case, and often fifteen, three or four of which have to be performed in the dark, some of them being besides, according to the author's own showing, delicate, and subject to frequent failures.

At the October meeting of 1856, M. Chambard presented a dead brilliant varnish for positive prints. This appeared to be nothing more, at least so far as the brilliant varnish was concerned, than an application of gelatine by means already well-known in the cardboard-box trade. He gave no formulæ. He also proposed a positive process on translucid sheets, which would realise, as he said, great advantages. It was quite certain that this method of preservation was purely mechanical and physical, independent of the production and chemical constitution of the proof; there was nothing for it but to exclude him from the list of competitors.

[The report extends to such a length that we must defer the continuation until next week.]

The above report was then approved and adopted by the Society, and ordered to be inserted in their *Bulletin.*

M. Bertsch then read a note, which was addressed to the Society by M. Berchtold, relative to a process of engraving photographic proofs (see p. 133), and exhibited several proofs taken in this way.

M. Davanne presented, in the name of M. Koch, ebenist, a new portable dark box for travelling, in which the maker had endeavoured to unite the latest improvements. The description of this apparatus would be unintelligible without a diagram. The thanks of the Society having been given to the above gentlemen for their communications, the meeting terminated.—*Condensed from the Bulletin of the French Photographic Society.*

Photographic Notes and Queries.

DRY PROCESSES.

SIR,—As the question of the comparative merits of the dry processes is being now agitated, if you think my experience of any worth, I will state it shortly.

In the first place, I must tell you that with almost *every branch* of *every process* I have had success; my results you know, and also some of my experience, and the fact of my having much time at my disposal, accounts for my making such an assertion as that of having worked almost, if not quite, every process.

Mr. John Draffin's experience has been very like my own. Taupenot's process, I have no hesitation whatever in saying, requires the least care, and is subject to the least risk in preparation of any of the dry processes. In my hands it has proved the most successful. I have just returned from an excursion, where I exposed 27 plates—18 stereoscopic and 9 large—and in these there is not a single failure, and never have I produced better pictures, although the objects might be considered difficult. I am totally at a loss to make out how operators contrive to get blisters—the great drawback to this process, if common opinion is to be taken. I believe that these will not be met with if the plates are dry before coating with collodion, and also when exciting the albumen surface to fit them for the camera.

In the "PHOTOGRAPHIC NEWS," May 13, I see that Mr. Mudd makes mention of purposing to make a box to keep collodio-albumen plates for a longer time ready for the camera. Surely no such thing is required; as I have before stated, plates in a tin box will keep good for weeks. I have used them often 5 or 6 months' old, and got good pictures as

a rule, with those kept this time. In short, with this process and common care, a man need never fail except by an accident, unavoidable in every process, or, indeed, in any common act of life.

Fothergill's process gives beautiful results, but there is an uncertainty about it which, with the very best manipulation, often shows itself. For instance, a friend of mine, after working collodio-albumen for some time, changed to this, and produced good pictures often, but seldom without *some* failures. A short time since, however, he visited a fine neighbourhood, and brought back a good quantity of exposed plates. He developed, and without a single failure, got a *beautiful* series of pictures. Of course, he declared that no process could be compared with Fothergill's, and he should work no other. In a few days he went on another excursion, and exposed a lot of plates prepared in the same way, and with the same chemicals; with these, to his intense disappointment, he scarcely got one picture fit to be printed. So it is that all my friends' experience speaks with *certainty* that the collodio-albumen far exceeds Fothergill's, because we must consider (as Mr. Draffin says) that process *best* which will work *every* kind of subject most perfectly. One advantage Fothergill's process possesses, the light passes through more perfectly, and so the positives are printed rather more quickly; this seems to me the only thing in which it is at all superior to the collodio-albumen. As to the results, was not the prize stereoscopic picture at Nottingham by the latter process? As to the ease of preparation, is not that the least liable to mistake where a man cannot wash too much? And in these good negatives by Fothergill's process which I have seen, the picture is seldom perfect to the very edge, as it is generally in the other.

I have no desire to depreciate Mr. Fothergill's modification, but it has been raised so high at the cost of the other dry processes, that the followers of the other methods have thought it only just to rescue them from what may almost be termed *slander*. Θ

SULPHATE OF IRON DEVELOPER FOR THE FOTHERGILL PROCESS.

SIR,—As I have obtained several valuable hints through the medium of the "PHOTOGRAPHIC NEWS," I think it only due to your correspondents who have given the photographic world so much information, to communicate to them through you what appears to me to be a discovery and a valuable one, albeit exceedingly simple and obvious, viz., that the protosulphate of iron developer, which has latterly come into such general use, and with such beneficial results in the production of negatives by the wet collodion process, may be used with equal success in Fothergill's process.

I have found that negatives obtained by Fothergill's process developed with pyrogallic acid are invariably inferior to wet collodion negatives in softness and half-tone; but when developed with protosulphate of iron, if the exposure has been rightly timed, the negative is almost (if not quite) equal to one obtained by the wet collodion process.

The development of the picture is also much more rapid when iron is used, and I believe that the time required for exposure is shortened in the same proportion as it is when wet collodion is employed, and developed with iron instead of pyrogallic acid.

It will hardly be necessary for me to add that a few drops of nitrate of silver must be added to the iron, in the same way as it would be added to the pyrogallic acid, if it were used; but I have never found it necessary to intensify with pyrogallic acid and silver afterwards, as is generally necessary in developing a wet collodion picture with protosulphate of iron.

I inclose a print from a negative taken a few days since on a Fothergill plate prepared about six weeks previously, and developed with iron; it had 3½ minutes exposure, calotopic lens, 15-inch focus, covering a plate 11 × 9 inches, the object, the door of a church, being well lit and near the camera.

The proof is rather over printed, and you will observe that the camera was not perfectly level when the view was taken; but it is the only print I have at hand, and it will serve to show that the iron developer is really applicable to the Fothergill process. H. S.

THE EMPLOYMENT OF SILICIC ETHER IN PHOTOGRAPHY.

SIR,—The following is the mode of preparation of the silicic ether, which you were so kind as to solicit in your last number.

The preparation is simple enough to any one having a knowledge of chemistry, but the expense is considerable. Alcohol containing 16 per cent. of water is gradually poured on to some chloride of silicium, a great quantity of hydrochloric acid is first disengaged, and the mixture must be put into a tubulated retort carrying a thermometer. On heating to between 160° Cent. to 300°, a mixture of aqueous alcohol and chloride of silicium first passes over, but when the thermometer marks 350° the receiver must be changed and the distillation continued on the naked fire. The liquid distills in a few minutes, and is the sesquibasic ether—$3\ C_4H_5O.\ 2\ SiO_3$.

A small quantity of aqueous alcohol must be added to this ether, and the mixture re-distilled. When the volatile products cease to come over, the contents of the retort thicken, and the operation is then terminated. On cooling, the mass solidifies; this is *the* silicic ether—$3\ C_4H_5O.\ 4\ SiO_3$. Wood spirit also furnishes these ethers.

As I have before said, its expense would be the greatest drawback to its use; but if it becomes a commercial article, I dare say it could be manufactured sufficiently cheap, just as was the case with aluminium, which used to cost as many pounds per ounce as it now costs pence.

H. C. JENNINGS, JUN.

DRY PROCESSES.

SIR,—In a paper by Mr. Draffin, read before the Chorlton Society, it is stated the collodio-albumen process is more rapid in its action than that of Mr. Fothergill.

My own experience leads me to the opposite conclusion, and the following experiment which I made when the idea was first started, proves it satisfactorily to my mind.

Having failed in my first attempts, from the too contractile character of new collodion, which split off on drying, I tried a sample which had been iodised for a year, and had become short or rotten; this I found answered for both purposes; it did not split with the Fothergill, nor blister with the collodio-albumen.

I prepared plates with both systems, same collodion; I exposed both at the same time with the same lens; one made for me by Millet, of Paris, a double combination 4-inch focus, with very small stop between the lenses; the result was, that I got an excellent picture in one minute by Fothergill, and an equal one in *three* minutes by the collodio-albumen.

I have lately tried the comparative experiments again with collodion made fresh by Mr. Keene, but although the time of exposure required was much shorter, I always find Fothergill's *three* times as quick; and if sal ammoniac be added to the albumen in the proportion of two grains to the ounce, the exposure will be reduced half.

Now, in these trials I was very careful not to wash the plates after sensitising more than was just sufficient to remove the greasiness, as I am aware that profuse washing before the albumen is applied, reduces the sensitiveness of the film, and hence no doubt arises the cause of such different results with different manipulators. It is only by comparing notes that we can arrive at truth, and it is with this view that I trouble you with the notes of AN AMATEUR.

P.S.—Mr. Draffin dries his plates in an oven; how are they protected from light during the operation? I tried a tin box, but the steam condensed on the plates and stained them.

ANSWERS TO MINOR QUERIES.

Recovery of Silver from Solutions.—*A Puzzled Amateur.* As your solution does not contain anything but nitrate of silver and the ordinary impurities which will unavoidably find their way into a nitrate bath after it has been in constant use for a year or so, you need not go through the whole of the process for the reduction of residues which we gave in our first volume, but may simplify the process very much in the following way:—Add excess of salt to the bath, allow the precipitate to settle, and pour off the clear liquid; put into the thick pasty mass of chloride of silver, cyanide of potassium, in coarse powder, until the chloride has dissolved; then add lumps of common washing soda, to about the same amount as the cyanide employed, and evaporate the whole down to perfect dryness. When dry, powder and project it in small quantities at a time into a red hot crucible; expose to a full red heat for ten minutes, and a button of pure silver will be found at the bottom of the crucible when cold.

Proto-iodide of Iron.—*Iodide*, and some other correspondents, have asked for the particulars of the preparation of proto-iodide for adding to plain collodion, as recommended by Mr. Seeley (vol. i. p. 280). Add 40 grains of pure proto-sulphate of iron, in fine powder, and thoroughly mix it up in a mortar with 24 grains of iodide of potassium, adding a drachm or two of alcohol, and grinding well together for five minutes; then add alcohol to make up the bulk of liquid to two ounces, and place in a clean, well-stoppered bottle. A few inches in length of clean iron wire (pianoforte wire is the best) should be beat up and put into the liquid, in order to keep the proto-iodide of iron from becoming per-iodide. There will be a deposit at the bottom of the bottle, consisting of sulphate of potassa; this may either be filtered off or may be disregarded, provided the clear solution only be decanted for use. When it is required to iodise a little plain collodion for rapid work, 1 part of this alcoholic solution of proto-iodide is to be added to 8 parts of good plain collodion; but only a small quantity should be made at a time, as the iodised collodion will not keep many hours.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Phosphorescence.—Some papers by Mr. Pearsall, on the effect of electricity upon minerals which are phosphorescent by heat, are to be found in the first volume of the *Journal of the Royal Institution*, pp. 77 and 267.

W. Child.—Received. Shall be inserted.

E. L. A.—1. The photographic part of your stereogram is not bad; but it is spoilt in the mounting—the right hand picture should be on the left side, and *vice versa*. 2. If you develop with gallic acid, you must not expect rapid development, as it will frequently occupy more than an hour. 3. You would be likely to obtain better results by using a pair of No. 1 lenses. Your ¼-plate portrait lens will not do so well for landscape photography as a 6-inch focus stereoscopic lens.

No Chemist.—In the first place our correspondent should endeavour, as soon as possible, to qualify himself for the signature "Chemist," instead of his present one, by studying our "Lessons on Chemistry" in vol i. Try what effect the addition of one grain of acetate of soda to the ounce of nitrate bath will have; that will be likely to increase the intensity of your pictures. Try the positive printing process, as given by our correspondent Θ in one of the early numbers of our second volume.

Iota.—We will make inquiries, and answer your question as soon as we can ascertain particulars.

J. B. N.—1. A mixture of equal parts of alcohol and ether, both pure, is the best for diluting collodion with. 2. They would be worth exhibiting, although they would not be likely to be the best of the sort in the exhibitions. 3. We have no control over the use which advertisers make of our published opinions of any article submitted to us for review. We do not object to an extract being made, if it is done honestly, and so as to represent our opinion fairly.

T. A.—Our correspondent's theory is ingenious; but we should wish to see some experimental evidence of its probability.

Delta.—By writing direct to the optician named you will obtain all particulars. Use the aplanatic lens.

Beginner.—1. The nitrate of silver bath used for sensitising positive albumenised paper always turns of a dark colour after being used for some time. Several methods of decolorising it are given in our former numbers. Of these we think the plan of precipitating a small quantity of chloride of silver from the bath, by adding a few grains of common salt, is the best. The chloride, in going down, carries with it the colouring matter, and the solution, after filtration, will be clear and fit for use. 2. The fogginess you complain of is attributable to your using a portrait combination instead of a view lens. With one of the latter, you will not meet with this defect.

J. C. L.—The process is not sufficiently worked out to enable very exact formulæ to be given. The chemicals named may be procured at any good operative chemists. The paper should not be albumenised. Our correspondent would be obliging many of our readers, as well as ourselves, were he to experiment a little upon this process, and forward to us the result of his labours when he has succeeded in discovering the most successful method of working.

A Subscriber from the First.—See second answer to "Beginner" above.

J. T. T.—Received.

Unfortunate.—Practice and experience is all that our correspondent wants, and all his difficulties will be found to vanish. The streaks on the plates may arise either from the bath not having an acid reaction, or from the plate not being allowed to remain in it long enough. The small chip out of one side of your lens will cause no other inconvenience except a slight diminution of rapidity, if you fasten a small piece of black opaque paper over it.

F. M. Y.—Fused nitrate of silver is generally preferred, but if it be not procured from a very good maker it will frequently produce inferior results to a bath made with the ordinary crystallised nitrate. Use from 30 to 35 grains to the ounce.

J. H. U.—We have forwarded our correspondent's queries to the author of the articles, and will insert the required information in our next number if possible.

Y. G. W.—Add some precipitated chalk to your hypo. bath; it will form a milky liquid, and will neutralise any acid which may be formed.

Bath.—Your gun-cotton is very bad; for the present buy it ready made, as with your slight knowledge of chemistry you cannot hope to make it equal to that which is made by experienced chemists, and properly tested. Your sample is quite insoluble in the usual solvents.

H. A. W.—You will find the calotype, or the waxed paper process, suitable for your purpose in preference to wet collodion.

B. L.—We cannot judge without seeing specimens.

P. N. C.—A portion of the hypo. bath has touched the positive paper when there was free nitrate of silver on the surface. You cannot now remedy the stain, but you must be more careful in future.

A. Pyro.—(Does not our correspondent mean A Tyro?)—The blue that is produced by the action of the iodine in the iodising solution upon the starch in the paper; it is no detriment to the process; on the contrary, many photographers prefer their iodised sheets of paper to be of this colour, and for this purpose free iodine is added to the iodising bath.

Kalos.—You cannot expect half a dozen grains of gold will colour an unlimited number of pictures. It has lasted longer than we should have expected, and we really think that the bath now deserves "refreshing" with a few more grains.

S. R.—If you really are what you say, "a subscriber from the first," you have subscribed to very little purpose, as the whole of your questions have been most fully and completely answered in our first volume; and had you consulted the index you could never have asked us such very trivial questions.

An Amateur.—Your letter has been forwarded.

M. H. Y.—Imperfect washing is usually considered to be the cause of fading; but according to Maxwell Lyte, the presence of chlorides in the washing water is very deleterious. On this account you will find washing the prints in distilled water of great advantage, especially as you say that you can get unlimited quantities of distilled water for nothing.

A Beginner.—For the present an ordinary spectacle lens of about 12 inches focus, and stopped down to half an inch aperture, will be as good a lens as you require; it will take better pictures than you imagine, and is as good to practice with as the most expensive achromatic combination.

S. T. T. O.—You should not have the tin box blackened, either inside or outside. Inside it is useless, as the box ought to be perfectly dark without the assistance of paint, and outside it will be injurious as tending to absorb heat and make the interior temperature too high.

T. Clark.—The letter did not arrive. We shall be glad to see the copy referred to.

Captain S. S. B.—1. No satisfactory process has yet been discovered by which a varnished negative may be transferred to waxed paper or gelatine. An unvarnished collodion picture may be transferred to gelatine by soaking the latter in water for a minute or so, until it has become thoroughly soft, and then introducing the wet picture on the glass into the dish of water, sliding it under the gelatine and lifting them both up together, and then resting up to drain. When quite dry, the gelatine will easily detach itself from the glass, and bring the collodion film with it. No varnishing is required. If the above plan be adopted for fixing a sheet of gelatine on a glass plate, and it be then dried, we should think that it would do well for taking collodion pictures on—though, as we have never tried it, we cannot speak for certain. 2. The best thing you can use in the plate drying box, is dry chloride of calcium; but care must be taken that it is placed so that it can do no harm, as it is very deliquescent and becomes liquid very readily in the presence of water. 3. Sulphide of ammonium is a good thing for precipitating gold from an alkaline toning bath, but not better than solution of liver of sulphur. 4. You can strain your precipitate through a piece of unbleached calico nailed on to a frame. We shall be glad to receive a description of the apparatus mentioned. Some points in your letter appearing of general interest, we shall avail ourselves of your permission to publish it.

Zingis.—No toning process is given at vol. i. p. 68; so we cannot tell anything about a print said to be toned in the manner there described.

C. Subscriber.—1. The enamel process is, we believe, patented; for the particulars we must refer you to the advertisement. 2. It will do very well.

Doubtful.—You have omitted mention of the aplanatic, which we think would suit your purpose best.

W. L.—1. We hardly think the caution is worth inserting. No photographer would expect to take a good picture if his tent were pitched close to a very offensive ditch. 2. Distilled water should be used for all the washings. 3. It may be filtered through paper. 4. We do not think it is to be washed after the application of the mucilage.

Photos.—Bromide of cadmium was intended. You must try the effect for yourself; we cannot enter into such very minute details, as to the exact effect produced; they would vary with every collodion.

Communications declined, with thanks:—W. G. (artist).—An Old Hand.—A Hater of Servile Copying. (We have neither space nor inclination to enter into controversy with any of our contemporaries.)—F. L. A.—U.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Ignoramus.—J. S. T.—An Artist.—P. O. S.—A. Hall.—R. A. C.—R. O.—An Amateur (Belfast).—C. M. A.—L. W. P.—F. A.—Distance.—M. H. B.—Albumen.—Philo. Pho.—G. M. T.—M. L.—Scientia.—R. R. R. B.

In Type:—John Sang.—Viator.—A Kerry Man.—T. Barrett.—J. W. W.—W. L. C.—S. S. B.—Henry Doubleday.—R. A. L.—Philoxymel.—Inquirer.—J. B.—N. T. A.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 39.—*June* 3, 1859.

THERMOGRAPHY. — CALORIFIC RADIATIONS CONSIDERED AS A MEANS OF PRODUCING IMAGES ON SENSITIVE PAPER.*

BY M. NIÈPCE DE ST. VICTOR.

The experiments which I am about to describe are an extension of those of Moser, Knorr, and Draper. I believe I have added to those facts which are already known, a large number of new and interesting facts of such a nature as to throw some light on this class of phenomenon. If, on a plate of metal heated by contact with boiling water, there be placed first an engraving, or a sheet having characters printed on it in printing ink, and over that a sheet of paper prepared first with nitrate of silver and then with chloride of gold, a violet blue impression is obtained of the *dark* parts of the engraving, or printed letters. If the paper be only prepared with nitrate of silver, the *light* parts of the engraving will be reproduced of a lustre colour. A metallic tube, heated to a temperature of at least 212° Fahr., and having the orifice covered with the engraving and sensitive paper, produces the same result as the contact with the heated surface.

With the paper prepared with the salts of both silver and gold, and using the plate heated to the boiling point of water, the large letters of the print are copied at a distance of several millimetres; but the effect does not take place if there be interposed a continuous film of mica, metal, or even of rice paper, however thin it be.

If we place between two pieces of glass a sheet of paper having letters printed on it in printing ink, and if we heat the whole to a temperature sufficient to slightly char the paper, it will be seen, after having removed the printed characters, that they have left an impression; and if on this image there be placed a sheet of paper prepared both with nitrate of silver and chloride of gold, and the whole be heated by contact with the plate heated with boiling water, a second image is obtained, the same as if the sensitive paper had been placed directly on the printed letters.

Designs formed with ordinary ink, with plumbago, or wood charcoal, are not reproduced if made on ordinary paper, but if on rice paper they are copied.

A photographic positive on collodion, not varnished, consisting of reduced iodide of silver, has yielded several consecutive impressions of the dark parts on sensitive paper under the influence of heat. The last proofs are even the sharpest and strongest.

Plates of glazed porcelain, having on them dark letters or paintings in different colours, drawn by hand and burnt in, have given me impressions when they were not coated with enamel; but they are not reproduced if the designs are so coated.

Coins and cameos are very well copied even at the distance of a millimetre, and in spite of the interposition of a continuous thin film of mica, silver, or copper, provided that the impression be bold enough and the temperature sufficiently high.

If a piece of paper, on which is traced a design in lampblack, or even in wood charcoal, is heated to a temperature sufficiently high to char the paper, it will be noticed on the *back* that those parts which correspond to the dark parts, are more carbonised than those which correspond to the light parts. A similar effect may be observed with the blacks and whites of a variegated feather or a differently coloured fabric. If, during the heating of the coloured fabric, it be kept in contact with paper impregnated with cyanide of potassium, the dark parts will impress themselves more strongly than the light parts.

Fabrics of various materials shaded in black and white or in various colours, similarly impress their images on sensitive paper prepared with both silver and gold salts, but this image is very variable; generally speaking, the dark parts print best, but frequently, also, it is the white parts which produce this effect. The image produced by each colour has a character and intensity of its own, the variations, doubtless, depending on the nature of the colouring matter, and the mordant employed to fix it, as well as on the composition of the sensitive paper. Indeed, colours produced by the same colouring matter fixed side by side by means of different mordants, produce very unequal and varying impressions. Garancine, for instance, applied to cotton, gives a red dye when fixed with a mordant of alumina; a violet dye with any irón salt; a dark brown or reddish brown with both iron and alumina, according to the proportions of each: the red impresses itself more strongly than the other shades on paper prepared with chloride of gold. In cases where white designs are obtained on a coloured ground by means of acids, it is sometimes the white parts, and at others the ground, which leaves an impression on the sensitive paper. On cotton coloured blue by means of indigo, and having white spaces, it is the blue ground which is reproduced, the white parts not being affected; whilst, if the cotton be coloured with Prussian blue, it is the white parts, on the contrary, which give an image, the blue parts being comparatively inert. If stripes of indigo and Prussian blue be placed side by side on a surface of paper or porcelain, it will always be the indigo which will produce an impression, and not the Prussian blue. The following is a convincing proof, which shows the great influence possessed by the intimate nature of the colouring matter or of the ink. I have seen two engravings from the same plate, but printed with different ink, one giving a positive, and the other a negative impression on paper prepared with chloride of gold.

I have attempted to obtain impressions of an image in the focus of a lens which should concentrate the calorific rays emanating from a heated body; but the result of my attempts has always been negative. I do not know whether the images formed in the focus of a concave mirror will prove to be more active; at present all seems to show that direct radiation without the intervention of any medium is an indispensable condition of success under certain circumstances.

The action which gives rise to the thermographic action is without doubt of a very complex character: the calorific radiations have much to do with it, but the material vapours emanating from the heated objects doubtless play their part. In the case, at least, of metals and dry wood, copied in spite of the intervention of a thin and continuous sheet of mica, silver, or copper, provided that the image be strong enough and the temperature sufficiently elevated, the action of the calorific radiations preponderates; and I think it is established that a sufficiently high temperature is capable of producing effects analagous to those which we daily see light produce, such as the reduction of salts, gold, or silver, the alteration of colours, &c. &c.

* Presented to the French Academy, May 23, 1859.

The luminous and calorific action can sometimes interfere or unite to produce simultaneously the same effects; but they are frequently distinct and separate, as MM. Bouilhon and Sauvage have recently proved.

I will terminate this paper with some details respecting the preparation and employment of sensitive paper in thermography. Prepare beforehand two solutions, one containing 4½ grains of fused nitrate of silver to the ounce of water, and the other of chloride of gold of the same strength. The sensitive paper, with nitrate of silver only, is prepared in the usual manner. That containing both silver and gold salts is prepared by floating a sheet of Swedish filtering paper on the solution of nitrate of silver, holding it by one corner; dry it gently before a fire, taking great care not to scorch it; and when it is perfectly dry, float the previously prepared side on the solution of chloride of gold, and dry it a second time, without allowing the temperature to reach 212° Fahr., since at this temperature the paper darkens.

To obtain an image, place the print with its back in contact with the plate heated with boiling water; on the face lay the sheet of sensitive paper, quite dry, and cover the whole with a sheet of glass some millimetres thick. On looking through the glass the image will appear in a few minutes. It is the more sharp in proportion as the paper is drier and less sensitive; if it be not sufficiently distinct, it may be forced out by exposing the sheet of paper to the radiant heat from a fire; if the image is very vigorous and stands out boldly from a nearly colourless ground, it may be fixed by treating it with a solution of hyposulphite of soda, to remove those portions of the gold and silver salts which have not been reduced by the heat. Paper rendered sensitive with both the silver and gold salts will not keep in darkness; it must therefore be only prepared as wanted, and be used at once.

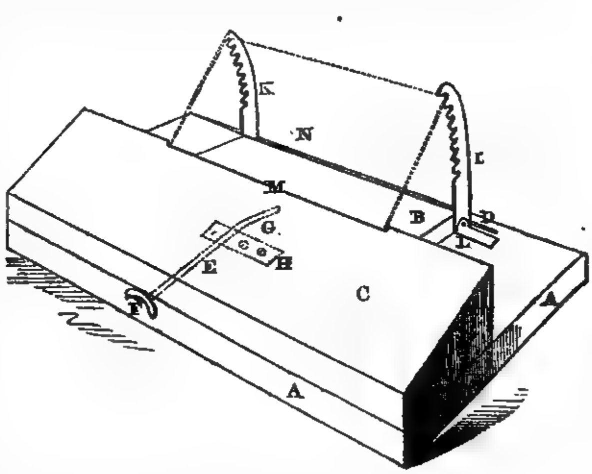
Paper prepared with very dilute nitric acid (1 per cent.), or with a solution of 45 grains of cyanide of potassium to the ounce of water, is sufficiently sensitive to yield thermographic images, but only at a much higher temperature than 212° Fahr.

Let me be permitted, in conclusion, to state that the experiments described in this new memoir date from the month of January last. At that time I showed thermographic images to several members of the Academy, and on the 29th of January I performed before Mr. Wheatstone some experiments which are mentioned in *Cosmos* of the 11th of February. On his return to London Mr. Wheatstone mentioned what he had seen produced before his eyes in my laboratory in the Louvre; and the editor of the "Photographic News," Mr. Crookes, thus noticed this experiment in his number of the 18th of February, 1859:—"Having prepared a paper with nitrate of silver and chloride of gold, M. Niépce placed a negative upon it, and inclosed the whole in a frame and submitted it to the action of heat. We have before us pictures obtained by these means."

INSTRUMENT FOR REPAIRING FAULTS IN NEGATIVE STEREOGRAMS.

This apparatus fulfils very effectually the purpose for which it was contrived—that of allowing the artist to work in a comfortable position at the very nice task of removing imperfections in negative stereograms, while it gives him entire control in the direction and strength of the light passing through the picture.

A A is a piece of wood, about 12 inches long by 9 broad, and ½ inch or so in thickness. C is another piece of wood, thicker at the one side than the other, so that its surface has a slope like a writing desk; it is 3 or 4 inches broad, and is fastened to A by two screw nails from the under side. The under side of A is covered with cloth, to prevent its scratching the table. B is a mirror, about the size of a stereographic plate, but a ¼ inch shorter; it is contained in a slight frame of zinc, from which two pivots project; one of them is seen at D. The pivots work in grooves cut in the wood, A, and are held in their places by thin brass plates not shown in the drawing. E is a brass wire, bent up at both ends; that at F is the handle. The part of the wire which is represented by the dotted lines, lies between the pieces of wood, A and C. The crooked end



of the wire, G, passes under the edge of the mirror; by turning the handle, F, the mirror is made to revolve on its pivots, D, and take any desirable inclination to the table. In order that the mirror may remain in the position in which it is put, the stalk, or connecting-piece of the wire, E, is a little bent; it lies and turns in a groove cut in the piece of wood, A, and a bit of stout brass plate, H, is screwed down upon it at one side only, and, acting as a spring, it gives sufficient resistance to the motion of the wire to counteract the trifling weight of the mirror. I and K are two pieces of brass, having a row of notches at equal distances, and wide enough to receive the edge of the glass plates. They would perform their work quite well were they fixed up immovably as shown in the drawing. But, in order that the instrument may take up little room, they are movable on two joints, one of which is seen at L. The joints are of the nature of stop hinges; so that, while the racks can fold forwards along the edge of the mirror, they cannot move further back than as shown in the drawing. A groove or notch, M, is cut along part of the edge of the wood, C.

In using the instrument, one edge of the glass, N (represented by the dotted line), is put in the groove, M; its other edge is supported by the notches of the racks at a convenient inclination. The right hand holding a pencil or a needle, rests on the inclined surface of the wood, C. The handle, F, is turned, until the light from the window or lamp, which falls on the mirror, is reflected through the negative in a direction, and with a strength suitable for the work which is to be done. A magnifying glass is held in the left hand. John Sang.

NEW COLLODIO-ALBUMEN PROCESS.

BY ALFRED NELSON, ESQ.

The dry collodion process I am about to describe, which is extremely simple in its manipulation, has also proved of great certainty in its results, as I think will be discovered by any one who may have a fancy to try it. In the first place we have but one immersion in a silver bath, and in the next place only one washing is necessary. Now, the nicety required in the quantity of water to be used on, as well as in its application to, a Fothergill plate after its removal from the silver bath, so as to produce a standard degree of sensitiveness, and in the Taupenot the two immersions in the

silver bath, and the two washings consequent thereon, are decided objections to these, not to say a word about the wrinkling and blistering of the film so liable to occur in the dry processes at present in general use. These objections I find, in a great measure, overcome in the practice of the following method, by which, during the last couple of months, I have taken some very fine stereo. negatives, and also some large portraits.

Good flat 16 ounce glass will be found to answer exceedingly well. I say *flat*, because if there is a warp in it, breakage in the pressure frame is almost certain. When the plates are cleaned, on which there need not be one half the time or care expended that is requisite for other dry or wet processes, the chief thing to look to being the absence of dust, I coat them at my leisure with albumen, prepared thus:—

Albumen from fresh hen eggs	8 ounces.
Distilled water	2 "
Bromide of ammonium	6 grains.
Chloride of ditto	1 "
Sugar of milk	8 "
Ammonia	20 drops.

Beat up to a froth by any of the methods usually employed, let it settle for a night, and filter through sponge in a funnel. Preserve this mixture in a stock bottle with a small piece of camphor. The way I proceed, so as to insure perfect freedom from tails or streaks on the glass, is in this way:—I take two empty and clean wide-mouthed bottles, into one I put a glass funnel, having a piece of clean sponge, damped with distilled water, loosely plugged into the neck of it, through this I filter the albumen from the stock bottle until wide-mouthed bottle No. 1 is nearly full, then change the funnel to the empty wide-mouthed bottle, and proceed to coat the plates from No. 1, as if using collodion, but instead of pouring the overplus back into the bottle I pour it into the funnel, and so on until No. 1 is empty; by this time No. 2 has received its quantum of albumen ready filtered to go on with, and the funnel is changed back again to the empty bottle No. 1, and so on until the plates are done. As each plate is coated and most of the superfluous albumen drained into the funnel, I rest it on a couple of folds of blotting paper with its face to the wall, one corner only touching; then I let it dry spontaneously, which it will do very soon if the room be dry and moderately warm; if it be too warm the albumen will not flow so easily over the plate. There should be no dust flying about on the surface of the plate, for the smallest spec, as every photographer knows, is often the nucleus of a great stain. A large, loose camel's-hair brush is about the best thing for removing any particles of dust from the glass just before albumenising. The time expended in the coating of the plate is about the same as that *saved* in the cleaning of it, and when dry it may be stowed away as a clean plate ready to be coated with collodion at any time, or used at once.

The formula for the collodion is as follows:—

Ether, sp. gr. 725	5 ounces.
Alcohol, sp. gr. 800	3 "
Iodide of potassium	8 grains.
Iodide of ammonium	15 "
Bromide of ammonium	10 "
Pyroxyline ... ... about	15 "

It may be made by mixing 2 parts of good negative with 1 part of a quick working positive collodion, the film not being too porous or too contractible. Coat with this on the albumenised side, let it set a little more than for the wet process, but not so much as that recommended for the other dry ones, and immerse in silver bath, made thus:—

Distilled water	10 ounces.
Nitrate of silver	350 grains.
Glacial acetic acid	10 drops.

The plate remains in this bath for four minutes, when taken out it is put into a dish of distilled water, while another plate is being collodionised and plunged; the former plate is then taken from the distilled water and washed for about three minutes under a rain water tap, on the mouth of which a piece of fine linen rag has been tied, so as to filter the water, and also to cause the stream to run smoothly; *don't spare the water*. Then to insure freedom from all chances of foreign matter remaining on the plate, I flush it back and front with two or three drachms of distilled water, and it is ready for the drying box. Nothing is better for this than one made of tin ware, or thin sheet-iron untinned (wood I don't like), the lid of course made light tight, and having at the bottom about a half a dozen folds of blotting paper, and one or two open vessels of good commercial sulphuric acid. The glasses are put to stand all round the inside of the box, with the prepared side next the tin, one corner only touching. The acid having a great affinity for water effectually removes moisture from everything in the box, thereby rendering the plates so dry that it will be found quite unnecessary to submit them to the action of ovens, or heat applied in any other way. If the acid has been used too often for this purpose, it becomes so impregnated with water as to cause it to absorb any more very slowly, and dry the plates but imperfectly; a little heat before putting them in the *chassis*, or otherwise packing them up, will then be useful.

The exposure in the camera is about one half more than that required for the wet process under the same circumstances.

The development is conducted in this manner: first, wet the plate with distilled water, either by pouring it quickly over the surface or by dipping—the latter I prefer; then for the stereo. size, pour on from a clean glass measure four drachms of the following developer:—

Distilled water	8 ounces.
Pyrogallic acid	12 grains.
Citric acid	8 "
Glacial acetic acid	1 drachm.

When this fluid has evenly covered the film, pour it back into the measure, and add to it 5 or 6 drops of solution, nitrate of silver 10 grains to an ounce of distilled water, and proceed with the development; when complete, wash and fix with solution of cyanide of potassium 4 grains to an ounce of water, or a moderately strong solution of hypo.—I prefer the cyanide. Whichever I use, I do not experience the blistering and wrinkling of the film, so liable to occur during the last washing in some of the other dry processes. When well enough washed, dry and varnish as usual for negatives.

Dublin, May 19, 1859.

A NEW PROCESS FOR OBTAINING BLACK PHOTOGRAPHS WITHOUT THE AID OF SALTS, EITHER OF SILVER OR GOLD.

BY M. NIÈPCE DE ST. VICTOR.

TAKE a red proof obtained by the means described by me in my communication to the *Académie des Sciences* on the 12th of April last, and which I repeat here.

Prepare the paper with a solution of nitrate of uranium at ten per cent., floating it thereon from 15 to 20 seconds, and then leaving it to dry in a dark place; if, however, it be dried at the fire, it becomes more sensitive to the action of light. It may be prepared several days before required for use. The exposure in the printing frame varies, according to the intensity of the light and the negative, from 8 to 10 minutes in the sunshine, and from one to two hours on a very dull day.

On taking it from the printing frame, the paper should be washed for several seconds in warm water, and then immersed in a two per cent. solution of red prussiate of potash; after a few minutes the proof is developed of a fine red ochre tint, after which it is washed in several waters until it ceases to communicate any tinge of colour to it, and then dried.

To turn this red proof to a black, it must be transferred to a five per cent. solution of perchloride of iron, to which

one per cent. of pure hydrochloric acid has been added. In the space of a few seconds the proof becomes of a greenish black; it is then withdrawn and rinsed in distilled water, when it assumes a beautiful black tone which it preserves when dry. The black is more or less intense according to the nature of the size used in making the paper. It must not be left too long in the water, especially if it be a little alkaline, because, in that case, the proof will assume a red tone, and for the following reason, viz., that ammoniacal water restores the red ochre tint, and acidulated water turns it to Prussian blue colour.

I have mentioned that the red proof may be toned to a green by means of nitrate of cobalt, and that under the influence of heat a very intense green may be obtained; unfortunately, this colour loses much of its brilliancy by hydration, and especially by the action of light. The sulphate of iron which I have suggested for fixing it, ends by turning it to a blue, which does not happen if the perchloride of iron be used without the addition of hydrochloric acid. The iron solution ought to be weak, and care must be taken that the proof is not left too long in it, that it is well washed in distilled water, and dried at the fire. It then retains a very beautiful green colour.

[A reference to our previous notice of a similar communication from M. Nièpce will show that we then mentioned a curious circumstance connected with photographs obtained with ferrocyanide of potassium, which is, that if they are exposed to light until they fade a little, the original vigour may be restored by placing them for a short time in a perfectly dark place.—ED.]

AN INSTRUMENT FOR TAKING MINUTE MICROSCOPIC PHOTOGRAPHS.

BY M. NACHET.

THE apparatus consists of a solid base analogous to the foot of a microscope, on which is fixed a small plate-holder, which acts the part of the camera. On the front of this box is fastened a tube, containing the object glass, and moved by a lever communicating with a fine adjustment, so as to allow of the object glass being moved to or fro by very small quantities at a time. This movement may be estimated by means of a scale on the head of the slow motion screw.

Behind the apparatus is arranged a tube, removable at will, to receive the body of a microscope, by means of which the required accuracy of focus is assured. To focus the object, a strip of clear glass is placed in the plate-holder, having on its anterior surface some fine lines scratched (used instead of the ordinary ground glass, the grain of which, showing in the microscope, hides the image). These lines are first adjusted to focus by moving the body of the microscope; and then the object glass, which is to form the image, is moved backwards or forwards until the image of the negative to be copied is seen perfectly sharp; it is then assumed, that the collodion or albumen plate, when put in the place of the scratched glass, will have its sensitive coating exactly in the focus of the object glass. The instrument is then ready for exposure, after some allowances are made for the greater or less thickness of the collodion films employed.—*Bulletin de la Société Française de Photographié.*

THERMOGRAPHY.

IN a paper, which will be found in another part of this number, M. Nièpce speaks of paper prepared with dilute nitric acid, or with cyanide of potassium, being sensitive to "a much higher temperature than 212° Fahr." Similar preparations to the above have been long used under the name of *sympathetic inks*, the writing of which would be invisible until held to a fire, when the written parts would turn brown, and scorch at a lower temperature than the other parts of the paper. Ordinary milk will be found a very good liquid wherewith to prepare thermographic paper of this sort, as sentences written with it on a sheet of white paper are quite invisible when dry, and will remain so until the paper is held before the fire, when the writing will be at once developed, showing that the paper is more sensitive to heat in the parts touched by the milk than in other places. Regarding the subject from this point of view, it will be found that the list of substances which, when applied on paper, render it sensitive to the calorific rays will include a vast number of bodies, both of organic and inorganic origin. Milk produces a reddish stain; the juice of the cherry becomes greenish; onion juice, nearly black; lemon juice, brown; vinegar, a pale red; and dilute sulphuric acid a reddish brown. To this list may be added most vegetable liquids, and also many inorganic salts. The above substances all act in a similar manner, viz., by becoming charred themselves, or by causing the paper to char at a lower temperature than would be the case under other circumstances. The colouring matter in this case is mostly carbon separated from the paper, or from the liquid used as the ink. Several substances are, however, known, which are, more strictly speaking, sensitive to heat, such as a mixture of ammonia, sulphate of copper, and sal-ammoniac, the mark of which on paper becomes yellow when heated; when paper is written on with a solution of chloride of cobalt so weak as to be almost colourless, it becomes of a beautiful pale blue colour when warmed. Hydrated oxide of copper, which is of a pale blue colour, loses water and becomes black at a temperature below the boiling point of water. If, therefore, paper were first prepared by soaking it in solution of sulphate of copper, and then in dilute solution of caustic potassa, the pale blue hydrated oxide of copper would be precipitated in the pores of the paper, and a very gentle heat would suffice to drive off the combined water and produce a strong black colouration.

Critical Notices.

Photographic Fac-Similes of the Antique Gems, collected by the Kings of Poland and the late Prince Poniatowski—accompanied by a description and poetical illustrations of each subject. LONGMAN AND CO.

DURING the last few years there has been rapid progress made in the application of photography to the reproduction of works of art, and the result is that now one of the chief means by which the works of art are communicated to the public is by means of photography, and not by engraving as formerly. Many and bitter have been the complaints which engravers have urged against this new-fangled mode of transcription, but still, as a general rule, the public seem to prefer the photographic to the graphic art; not that we would for one moment underrate or disparage the beauty of the engraver's art. Should the day ever come when it should be but partially employed, or in any way neglected, none will feel more sorry than ourselves; but still, while we admire a good engraving we cannot but at the same time avow our great admiration for a good photographic copy; and we think there are very few who have any taste in art matters who will not endorse our judgment. Noting the events in the history of photography we cannot help recurring to the dire prophecies which hailed its advent—when the painter dreaded lest the camera should invade the territory of high art and poetry, and the engraver predicted for it the ignominious fate of a "nine days' wonder." We have now seen all these prophecies falsified, and in spite of them the art has progressed at such a rate as to astonish those who were its warmest admirers. Not only has the art advanced but it has carried along with it public sympathy—a sympathy which is every day becoming more and more widespread. Not only has it commanded sympathy, but it is now beginning to assert itself in such a manner that even the vigorous opponents of its youth are beginning to see for it a glorious future. The opinions of all the leading art critics seem to be that ere long it will almost entirely supersede engraving. One writer has already seen in the progress of photography "the decline of line engraving." Another says that "the days of dot and stipple are numbered." Many

others express themselves in a similar manner, while the arch art dictator, Mr. Ruskin, has avowed that he would prefer a few photographic copies of pictures to a cartload of engravings. These indications of opinion clearly point to a great future for photography. It will be seen, on a little reflection, that the advantages that can be urged in favour of photography as a means of transcription far outnumber those that can be urged in favour of engraving. First, there is greater facility in transcription; and this is one of the chief drawbacks against engraving, especially in a commercial point of view. It frequently happens that a publisher wishes to issue engravings of some good picture; it is at once put into the engraver's hand, but, let him work as assiduously as he likes, a great length of time must necessarily elapse ere the plate is ready; the consequence is that by the time the engraving is ready for delivery to subscribers, many new, possibly superior, subjects have attracted public attention, and the subscribers are naturally annoyed at the arrival of a picture when least wanted. Secondly, the copy taken by photography has the great advantage over engraving of giving the possessor an exact fac-simile of the original production. Such is not the case in an engraving. Let the engraver be as faithful and careful as possible in his rendering of a picture, he cannot but impart a great deal of his own individuality into the engraving, and in many instances this is done to such an extent as to almost entirely destroy the beauty of the original master. Whereas photography, being a mechanical means, cannot but render truthfully that which is placed before it, and thus give all the original feeling, touch, and personality of the artist. It is a conviction of the truth of these remarks that has led the publishers of the work before us to illustrate it by means of photography. After alluding to the attempts to copy these gems by casts, by means of wax and plaster casts, it was found that the art public did not appreciate them. "After a great expenditure, both of time and money, the late proprietor made the acquaintance of Mr. Collis, whose attainments in the photographic art enabled him to give perfect fac-similes of these antique gems, imparting to them a tone which brings out the original design with more pleasing effect than can be done by the plaster process or *the skill of the steel engraver*." The collection consists of the whole cabinet of gems inherited by the late Prince Poniatowski, and as an illustrated work on mythology it is one of the most valuable, authentic, and unique works that ever has been published. Not only have we exact transcripts of the cameos and gems, but there is a most carefully written letter-press series of notes, from the pens of Dr. Maginn and James Prendeville, B.A. As to the historic interest and importance of this work we had better let the editors speak for themselves.

"Amongst the most valued specimens of the fine art productions of the ancients, preserved from the all-devouring influences of time, accident, and the wreck of barbarism, engraved gems stand pre-eminent in the estimation of the antiquarian and the learned in historic lore. Those antique gems which have thus escaped the common fate of ancient art, constitute the connecting link between the sister arts of painting and sculpture. While our knowledge of the degree of excellence to which the ancients attained in these last-named arts is confined to a comparatively few mutilated frescoes and statues, engraved gems have been preserved in all their original perfection and completeness; the material of which they are composed, in most instances, being imperishable. They demonstrate the high artistic talent, grace, and skill of the ancients in allegorical designs.

"These gems are equal in every particular to the finest statues, and in many particulars to the finest paintings of antiquity. They possess all the delicacy of proportion, and all the development of grace, or dignity, or terror, exhibited by the statues. As in these figured volumes is to be found all that regards the fable or the history, the ceremonies or the exercises, the customs or the habits of the ancients; and as they enable us, as it were, to see the features and feel the lineaments of those great personages whose characters and actions, as described by the historians and poets of old, have been a source of instruction and pleasure to all ages, the preservation of faithful copies of the original relics, in a form easily referred to, will doubtless be the ambition and desire of the learned and curious."

Of the photographic portion of the work we may say that generally it is executed in the best style; the defects which are here and there observable in the prints arise from circumstances over which the photographer has had no control. Of the work as a whole we can safely say that we have not seen anything yet to equal it in beauty and elegance.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

The Figure.—A photographer generally places his sitter in that position which secures the greatest steadiness—a sitting posture is the most common; as in this case the figure comes forward more than the head.

Now as all projecting parts become in the camera too large in proportion to those receding, we see the reason of the body being too large. The same cause accounts for large hands in photographs, and, where the face is turned up, for the lower parts of a head, chin, mouth, nose end, &c., being too large, whilst the eyes, forehead, and top of head are too small.

If a lady be sitting in a half reclining posture, bending forwards slightly, her whole head and shoulders will be too large, her figure downwards too small. If a gentleman be sitting backwards, on the other hand, he will have his hips too broad, his shoulders too narrow; both of these positions are very common.

We must not be misunderstood as stating these things in disparagement of so beautiful a science as photography becomes in the hands of experienced practitioners; but rather let us be understood as endeavouring to point out some "effects defective," which generally are seen in photographs, especially large ones, that those who will, may, knowing the cause, obviate them; and that the colourist may correct with his brush defects which, if allowed to remain, spoil any picture. For instance, where a head is so irregular in form as to become unsightly, soften those features which are the most strikingly deformed, and reduce the head to a greater semblance of beauty. Try to discover what good points there are—for all heads have some good points—and give these their full value.

To show the better how to correct these deformities, here are some general rules for making a figure symmetrical. A well-formed female has a rather small head, long taper thin neck, narrow across the shoulders, plump bust, broad hips, short round arms, small fleshy hands, taper fingers, at every joint round and smooth. A manly figure has a larger head, thicker neck, broad shoulders, narrow hips, muscular arms, and square joints.

To Remedy Other Defects.—From the circumstance of blue and white possessing so much of the actinic principle, all fair, pale people make the brightest and best photographs; whilst the ruddy and sallow make dark ones. Often is it seen that a fair young person, with *round* rosy cheeks, produces in the picture an almost *flat* cheek, from the *red* in the cheek having produced a dark tone. This the artist will remedy by painting it up in finishing with a little body colour, white, vermilion, and carmine, or otherwise, as required to suit the complexion.

As just stated, the red or sallow face makes a dark photograph; in painting choose as light a copy as possible to paint upon. During the progress of your picture the freckles and much of the dark tone will disappear; but if, in finishing, they should be found still to show, and the blackness prevents your obtaining that brilliancy of colour required to approach nature, you may, with medium, stipple upon those places which still seem dingy and grey. This will enable you to produce the bright tints wanted, and will entirely hide any unpleasing appearance of a wrong complexion.

Draperies.—Black Cloth.—With lake and ivory-black go over the most intense shadows of your photograph, taking care to keep every fold as near as possible in its present place and form; for no amount of after pains will enable you to equal the truthfulness of a photograph in its representation of texture, or the accurate forms of folds necessary to make

out the true character of the particular material represented. Having done this when dry, go over what you had touched with medium or gum. Next take ivory-black, a little lake, and white, mix well together into an opaque body, much lighter than upon comparison with cloth would appear necessary, to allow for sinking, and for the gum to be passed over, which deepens it much. With this go over the entire coat, keeping out of the black shadows already laid on.

When dry go over again with gum; then take the same colour, with more white and a little vermilion, to give the peculiar glossy colour seen in the lights of black cloth, touch them on with the colour partially dry, to give a sort of crispness of touch.

(To be continued.)

Dictionary of Photography.

Colour.—A ray of solar light is composed of an indeterminate number of differently coloured rays; and since, on the one hand, it is impossible to distinguish each in particular, and as, on the other, they do not all differ equally from one another, they have been divided into groups, to which are applied the terms, red, orange, yellow, green, blue, indigo, and violet rays; but it must not be supposed that all the rays comprised in the same group—*red*, for instance —are identical in colour; on the contrary, they are generally considered as differing, more or less among themselves, although we recognise the impression they separately produce as comprised in that which we ascribe to red. If a ray of light which falls upon a body is completely absorbed by it, as it would be in falling into a perfectly obscure cavity, then the body appears to us black, and it becomes visible only because it is contiguous to surfaces which transmit or reflect light. Among black substances we know of none that are perfectly so; and it is because they reflect a small quantity of white light, that we conclude they have relief like other material bodies. Moreover, what proves this reflection of white light is, that the blackest bodies, when polished, reflect the images of illuminated objects placed before them.

When a ray of white light is reflected by an opaque coloured body, there is always a reflection of *white* light, and a reflection of *coloured* light; the latter is due to the fact that, the body *absorbs* or extinguishes within its substance a certain number of coloured rays, and *reflects* others. It is evident that the coloured rays reflected are of a different colour from those absorbed, and, also, that if they were combined with those absorbed, they would reproduce white light. It is evident, from the manner in which we have considered the physical composition of solar light, that if we reunited the total quantity of the coloured light *absorbed* by a coloured body, with the total quantity of coloured light *reflected* by it, we should reproduce white light; for it is this relation, that two differently coloured lights, taken in given proportions, have of reproducing white light, that we express by the term *complementary colours*. It is in this sense we say that Red is complementary to Green; that Orange is complementary to Blue; that Greenish Yellow is complementary to Violet; that Indigo is complementary to Orange Yellow, and *vice versâ*.

It must not be supposed that a red or yellow body reflects only *red* and *yellow*—besides white light, they each reflect *all kinds* of coloured rays; only, those rays which lead us to judge the bodies to be *red* or *yellow*, being more numerous than the other rays reflected, produce a greater effect. Nevertheless, those other rays have a certain influence in modifying the action of the red or yellow rays upon the organ of sight; and this will explain the innumerable varieties of *hue* which may be remarked among different red and yellow substances.

Combustion.—When two chemical bodies unite with each other with sufficient violence to cause an evolution of heat and light, the phenomenon is called by the name of combustion; and since the air which we breathe contains one of the most energetic *supporters* of combustion, *oxygen*, the term is generally applied to the appearance presented by the rapid union of this constituent of the atmosphere with combustible substances. The terms, *combustible*, and supporter of *combustion*, are, however, indeterminate ones, since in an atmosphere of coal gas, a jet of oxygen or of chlorine would burn as combustible bodies, whilst the coal gas would become the supporter of combustion. The term, *combustion*, is frequently employed in scientific language, to signify chemical union without evolution of light and heat.

Concave.—Hollow, opposed to *convex*.

Concave Lens.—A lens bounded by a concave surface; a plano-concave lens is bounded by a plane surface on one side, and a concave one on the other; a double concave lens is bounded by two concave surfaces.

Conjugate Foci.—The two points on opposite sides of a lens, respectively occupied by the *object* and the *image*, are called the conjugate foci; and any object placed at either of these positions, will have an image of itself formed at the other point. When one point recedes from the lens the other approaches it, as is familiarly known in focussing in the camera; and when the object focussed is situated at such a distance that the rays coming from it to the camera are, for all practical purposes, parallel, the conjugate focus is at its least distance from the lens, and is then called the principal focus.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, May 31, 1859.

Photography and War! Such has been the cry for some weeks past in Paris. How odd to see the beautiful and peaceful science of chemistry brought by photography into such near relationship with the horrible art of war! Yet, so it is, at least in France, where, at this moment war is the main topic of the day. One would imagine that even the women of Paris were in a fighting mood, to judge from a *brochure* just published by Madame Dudevant (Georges Sand), entitled "La Guerre;" but that is not the case. No doubt Georges Sand was simply inspired by the example of Miss Harriet Martineau, who has lately brought out a work called "England and her Soldiers." Journalism, say some, is the offspring of war; for, according to Voltaire and some other writers, it was at Venice, during the war with the Turks, that despatches were published for the first time in the streets. The people assembled to hear them read, and paid for the intelligence a small piece of money called *gazetta;* hence our word gazette. So, all the French papers teem with news of the war at the present moment, and photographic journals among the others.

La Lumière, a paper which gives now and then a little photographic news, has sent her "own correspondent," M. Berardy, into Italy. Of course he got pretty well drenched by the incessant rain as soon as he touched Italian shores.

If anything in the world is annoying to an enthusiastic photographer, it is bad weather. Clouds make him dull and hypochondriacal, fogs produce serious illness, and perpetual rain kills him outright. M. Berardy, as soon as a few glimpses of the sun had restored him again to life, shouldered his camera, and was immediately overwhelmed by the Italians with questions concerning "*the new instrument of war*" he had brought with him—how far it would shoot, and how many men it would kill at a time! The want of supplies of photographic agents keeping him in pretty constant connection with the principal *pharmacies* of the different places he visited, M. B. was at last looked upon as a doctor in medicine, travelling with some newly invented *surgical instruments!* And, considered as such, he will, no doubt, be left unmolested, and quietly send up some interesting photographs before long.

Those who are fond of the stereoscope, and who possess a

series of M. Gaudin's stereoscopic slides, taken in Italy, would be able to follow the belligerent parties step by step; or, better still, perhaps, with the stereoscopic views of Genoa, Milan, Turin, and the whole of Piedmont and Lombardy, executed very beautifully by M. Ferrier, member of the *Société Française de Photographie*. We may add that the views taken in Tuscany, Naples, Rome, Venice, &c., by MM. Alinari, Lorent, Naya, Bernard, &c., many of which figure in the present great Exhibition of Photographic Art, of which we have lately spoken, become interesting certainly at the present moment, on account of the unhappy events taking place, or about to take place, in these quarters.

Already, some months ago, the artillery officers of the guard of Versailles received photographic apparatus; laboratories have been organised for them in the French camp, and they will have orders to point their *camera* at the same time as their cannon.

We understand that M. Porro, of Paris, the able astronomer and experienced photographer, is about to make known to the French government a new photographical apparatus, especially adapted for the present war. No one could better construct such an instrument, since M. Porro distinguished himself many years ago as colonel of an engineering corps. He will favour us with a description of it in a few days.

At the theatre of the *Palais Royal* a piece of the most ludicrous nature is being represented. A certain M. Oscar Plantureux, a photographer by profession, has, by some accident or other, taken a proof of somebody's leg! No one knows whose leg it is—although it appears to be a most beautiful specimen of the kind—nor, how it came to be photographed at all! The fact is, that nothing, now-a-days, can escape the objective of a photographer. In two minutes he has ten proofs of your garden, the front of your house, the face of your sweetheart, or your wife even! After all kinds of adventures, M. Oscar at last finds out the person who belongs to the leg, the photograph of which he has possessed so long, and . . . marries her of course!

It appears that M. Dove, the eminent professor of physics at Berlin, has lately applied the stereoscope to rather a novel purpose: viz., that of detecting fradulent bank-notes. If two genuine notes be placed side by side in a stereoscope no *relievo* is obtained; but if one of them be taken away and replaced by a fraudulent imitation, certain parts of the stereoscopic image now seen are immediately observed to stand out as if solid.

This being the case with German notes, why should it not be so with English ones? and if every banker in the United Kingdom who is not already overwhelmed with stereoscopes and stereoscopic slides, does not immediately procure the above-named instrument and save himself so many thousands a-year by applying it to the above purpose, it will not be our fault.

M. Plücker, another distinguished German *savant*, has lately made known the following interesting results of some experiments on the spectrum, produced by the electric light when developed in a gas, or in a mixture of different gases.

Hydrogen gas and nitrogen were first submitted to experiment. When an electric current produced by the apparatus of Ruhmkorff developes a light in a mixture of hydrogen and nitrogen, a peculiar kind of spectrum is obtained when this light is analysed by a prism. The same spectrum is produced when two spectra obtained separately by hydrogen and by nitrogen are superposed. The same spectrum is again obtained when the induction current passes through ammonia in a gaseous state; when it is probable that ammonia is decomposed in this experiment into nitrogen and hydrogen.

M. Plücker has made similar experiments on carbonic acid gas. The spectrum obtained with carbonic acid is identical with that which results from the superposition of a spectrum produced with carbonic *oxide* into another obtained with oxygen gas. Both are the same as the spectrum obtained when the electric current passes through a mixture of carbonic oxide and oxygen gas.

One of the most interesting discoveries that have been made for some time past in mineralogy, is the following, which we owe to M. Raphael Napoli, professor of chemistry at Naples:—On examining the lava which has been emitted for more than twelve months past by Vesuvius, M. Napoli found that it contains a considerable proportion of selenium and tellurium, combined with titanium, iron, and lead. As the lava cools, the sulphurous acid vapour, which abounds in it, partially destroys these combinations of selenium and tellurium, producing a great quantity of pure selenium, which is deposited, and oxides of selenium and tellurium, which are disengaged, and emitted into the air in a gaseous state and in large proportions.

Pure selenium is thus deposited in the cavities and crevices of the lava, and in the interior of the solidified mass. No one had ever remarked this before. Doubtless selenium has often been seen in the fissures of lava; but, from its red colour, it has evidently been as often mistaken for oxide of iron.

To chemists, this discovery is of the highest interest. Both tellurium and selenium are such rare substances, that they are only known as curiosities of the laboratory, and few laboratories indeed possess specimens of either. Up to the present time tellurium has been found, but very rarely, combined with gold, silver, lead, and bismuth, in the Transylvanian mines. In appearance it resembles antimony. It was discovered in 1782, by Muller, of Reichenstein, and its principal properties were made known by the then eminent chemist, Klaproth. Selenium, which bears much analogy to sulphur, was discovered in 1817, by the celebrated Berzelius. It has hitherto been found only as a seleniuret of lead, a rare mineral, or combined in some sorts of iron pyrites. A native seleniuret of copper was discovered some years ago, and named *Berzeline*, in honour of the great chemist whose name we have just mentioned.

Before the interesting observations of M. Napoli, selenium had never been found in nature, otherwise than in combination with other bodies. M. Napoli has also described a new substance, which appears to be a combination of lead and selenium, discovered by M. Palmieri, the distinguished meteorologist of Vesuvius, in certain *fumarolle*, and which has been named *Sacchite*, in honour of Professor Sacchi, of Naples.

M. Napoli has also observed a peculiar white substance which exists in the crevices of the lava, from whence it is easily volatilised, mixes itself with the air, absorbs moisture, and falls again, forming a sort of crust on the upper surface of the beds of lava. This appears to be another combination of selenium not yet thoroughly known. These facts show us that a new mine of interesting chemical products is open at Vesuvius, and promises fairly to be a rich one.

M. Wartmann, of Geneva, announces that on the 21st of July next, about four o'clock in the morning, that is, a little before sunrise, the planets Venus and Jupiter will be very nearly in conjunction. The borders of these two brilliant planets will be only 15″ apart, and consequently both will be able to be seen in the same field of the telescope.

This will-be-fact, which is not mentioned in the famous *Connaisance des temps*, presents, however, considerable interest, inasmuch as Venus and Jupiter are the two most brilliant planets belonging to our system. Their approach will enable us to measure photometrically their relative brilliancy, and they will form an interesting subject for a photographic proof.

NOTES FOR PHOTOGRAPHIC TOURISTS.

SIR,—I would earnestly call the attention of photographic tourists to this locality, only twenty miles from *Killarney*, and abounding with views. As Moore says—"the sweet magic of streamlet and hill" is here on every side; the mountain torrent, with its rocky bed and waterfall; the lakes studded with wooded islets and surrounded with mountains; the sweet inland river "bits," and savage rocky seashore—all are here. Midway between Killarney and Glengariff, but

ten or twelve miles from Glenflesk, Gougame Barra, and Inchegelagh on the east; on the west, nearly twenty-five miles from the open ocean, though the salt water is here at our doors; on the north and south shores of this fine estuary there are many beautiful harbours—Dunkerron, Blackwater (the bridge here is a gem, and but five miles distant), Sneem, Westcove, and Derrynane (D. O'Connell's residence), on the north side; Arday, Kilmackalogue, and Ardgroom, on the south; most of these are at the entrance to the glens that seem to pierce the mountain ranges north and south, and many wild and beautiful lakes are to be found, as at Clooney, Inchequinn, and Glenmore. As one nears the sea the coast gets more and more wild and savage, and in places is only to be surpassed in grandeur by the far-famed cliffs of Moher. Of such bits as those of which I send you three prints, there are literally hundreds if one knew where to go to find them; the only drawback is that the distances are so considerable that it is always necessary to drive, and I know that that is unprofitable work, if one does not know the country and the *people here*. From where I now sit I can see Mangerton mountain and McGillicuddy's Reeks, both capped *with snow*, on this 14th of *April*, the "Reeks" rising full fifteen miles off, but from this, appearing to be but the head of a giant ladder, formed of the intermediate hills. I have never met with any one who was disappointed in his expectations here, except, indeed, he came in wet weather—a contingency by no means impossible; but they who pass through only as tourists know but little of the country; it was not till I had trod the hill-tops in search of grouse, and explored the streams and rivers for trout and salmon, that I well knew the riches of its scenery. Should any amateur photographer think of tarrying here to take away the mountains in his plate box, I shall be glad to direct him to the most desirable spots, and I would advise a fishing rod as a companion; it will fill up many a blank day not fit for camera work.

As one of the inducements to go to any particular place for photographic work is the convenience for travelling, I would mention that a "through" ticket can be got in Cork, during the summer months, to take a tourist by a four-horse car through Bandon, Inchegelagh, Gougaune Barra, and the pass of Keimaneigh, to Bantry, and on to Glengariff, where you put up for the night, then through Kenmare to Killarney, and thence by rail to Mallow and back to Cork, I think for the sum of thirty shillings or two pounds. It is allowed to break the journey at Glengariff, Kenmare, or Killarney for a month. A KERRY MAN.

Kenmare, Kerry.

Photographic Societies.

THE FRENCH PHOTOGRAPHIC SOCIETY.

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

The communication made by M. Homolatsch, of Vienna, in November, 1856, detailed a method of printing, the principle of which had been given by M. Bayard so long ago as 1851. The proofs, at first formed by the influence of light on chloride of silver, pretty nearly as under ordinary conditions, were afterwards continued by the action of gallic acid. The instructions given by the author were obscure and incomplete; at our request he developed them, but they were open to sundry scientific objections, and were not recommended by practice; the only proof sent was anything but satisfactory; it was therefore impossible to retain M. Homolatsch among the number of competitors.

The fifth in the order of date was Mr. John Walsh, of London. The application of his method was limited to positives on glass, and offered nothing new. The two proofs sent had all the faults almost inseparable from this process; this was therefore put aside.

Next came M. Blanquart Evrard, of Lille, with a varnishing process, which consisted in the successive and, if necessary, reiterated employment of gelatine and tannin, so as to form a compound which M. Blanquart called leather-varnish. This process, the advantages of which cannot be contested, entered, nevertheless, by its nature, in the category of mechanical and physical means, for which reason we had already excluded M. Chambard.

M. Jean Schaëfer, of Frankfort-on-Maine, presented himself on the 18th of March, 1857, with a method of fixing and toning, the good results of which you have all of you appreciated, and which many eminent photographers have taken for the effect of collodion transferred to paper. But we ought to say that it could not be admitted as the personal work of M. Schaëfer. Employment of the sel d'or of Fordos and Gelis, sizing with gelatine, application of Schœnée varnish, such was the *ensemble* known and used simultaneously by several brethren in the art, as regarded its chemical part, and still more extensively used as far as regarded its purely physical part. M. Schaëfer evidently employed peculiar care in applying it, as is evident from his uniform success; but it was not a sufficient title for competing for the Luynes prize.

M. Violon proposed to produce proofs on a film of salted collodion, previously transferred, as taught by M. Bayard in March, 1857, on a sheet of paper. This method has certainly some advantages from the point of view of stability; but it was less simple, and consequently less practicable than the old, and did not allow as great a variety of tones. In short, weighed altogether, we did not recognise any practical advantages in these modifications, and sufficient conditions of indestructibility.

At the meeting of July, 1858, M. Gaumé communicated to you a method of sizing the paper, of which he had already given you specimens just two years previously. It was a real novelty, but confined all the proposed modifications to the above-mentioned sizing. The operation consisted in dissolving gutta-percha in benzoin, in decanting the clear portion of the liquor, separating the gutta percha from the benzoin by evaporation, which leaves a finely-granulated substance, then plunging the sheets of paper in a bath formed of the residuum in a state of fusion. This preparation gives them a species of impermeability which doubtless diminishes the chances of an alteration of the organic matter, and, under this aspect, it might be useful; but the further treatment remaining the same, and the gutta percha bath being besides a complication, the process appeared to us to constitute a too limited advance to create a claim for the prize.

Here ends the series of processes which we at once dismissed from competition for the prize. These being eliminated, there remained four competitors whose labours, by reason of their importance and the quality of the specimens produced, claimed a serious examination.

It would have been difficult to get the commission to assist at all the experiments which would be necessary; therefore, as we stated above, we confided this part of the common task to MM. Count Aguado, Bayard, Becquerel, L. Foucault, and Paul Perier, forming a sub-committee, whose peculiar operations we will describe in this section of the report.

It was arranged that each of the candidates separately should be required to operate before our eyes, without any reserve, so as to render us witnesses of all the phases of the process.

To carry out this object we met at the house of our colleague, Count Aguado, who kindly placed himself at our disposal, together with all the *matériel* of his *atelier*.

We first summoned there M. Testud de Beauregard. In a first sitting he showed us only a part of his process of June, 1855, the papers having previously received, without our witnessing it, the preparation with the bichromate of potash which precedes insolation. This was a deviation from our programme to which we shall have to return. The weather was dull; the exposure in the printing-frame long; the papers, when taken out, were slightly impressed by traces of the negative. They were washed in common water, then floated in a solution of proto-sulphate of iron, again washed, then immersed in a bath of gallic acid and water. We are bound to say that the results were very unsatisfactory, and bore no comparison with the proofs presented by the author in 1855. M. Testud de Beauregard did not persist in attempting a second experiment, and hence we consider the first as decidedly negative.

At a second meeting the same gentleman was to make all the manipulations necessary to enlighten us on the subject of his communication of December, 1857. By an unfortunate

* Continued from vol. ii. p. 142.

misunderstanding, he arrived, as on the first occasion, with his papers ready prepared. M. Testud having placed his papers, which were of a dark grey appearance, in the printing frame, left them there some time; the sky was cloudy. Removed without having received any apparent impression, they were submitted to washings in hot water; but this final operation was to extend to such a lengthened period, that the commission could not follow it to its termination; M. Testud told us it would occupy from four to five hours. The work was finished at Count Aguado's in our absence, and the specimens obtained were forwarded to us by him. These were even less promising than those obtained by the first method, and so far removed from all probability of success, that we did not think it necessary to call another meeting for the purpose of having all the phases of the operation performed before our eyes. Was it not evident that the preparation of the paper could not under those circumstances be better than when performed by the author in his laboratory at his leisure?

We have now to consider the process of Messrs. Salmon and Garnier.

They commenced by dissolving 30 grammes of white sugar in the same weight of water; they then added 7·5 grammes of bichromate of ammonia, and then 10 grammes of clear albumen, in which they had introduced some particles of the bichromate. After the whole was well mixed, they poured it through fine linen, and then coated with it a sheet of paper fastened to a flat surface by means of a round hog-hair brush. In order that the film should be free from striæ or traces left by the brush, they took as exactly as possible the precise quantity required to cover the sheet of paper. That done, they warmed the reverse side of the sheet before the fire, without approaching it too closely; the drying was soon accomplished, which was ascertained by rubbing the surface slightly with the finger; this should slip easily over it, though the surface still appear a little sticky in pressing upon it. Finally, they placed it in the printing frame. The first proof, which was taken under a positive on glass, was exposed for a quarter of an hour, the weather being less favourable than it might have been. On taking it from the printing frame, the image was strongly visible by an increased intensity of the yellow-brown tone of the bichromate; they then warmed it slightly before the fire; the heat appeared to continue the action of the light, thus furnishing a means of partially modifying the tone of the blacks. The sheet being again fixed on the board, they spread finely divided ivory-black over its whole surface, by means of a thick, badger-hair brush, long enough to be flexible without being too soft, and finished the spreading and the equalisation of the film with a soft wad of cotton. After detaching the sheet from the board, and holding it for a few seconds at the fire, they immersed it carefully in common water, face uppermost, occasionally gently moving it backwards and forwards. After about a quarter of an hour, when they judged that the soluble portion of the film was detached from the paper, they removed it carefully from the water by means of two corners. The paper had, in this stage, a dirty white appearance in the lights, but presented a very distinct image. Finally, they immersed it in a bath composed of 100 parts of water to 5 parts of a strong solution of sulphurous acid (proportions which may be modified either way, the action then becoming more or less rapid).

The same precaution must be observed in handling the proof in this final bath, because the insoluble film which holds the carbon adheres but feebly to the paper so long as a previous drying has not taken place. On this account, it would be useful to dry it once between the simple water bath and that of the sulphurous acid.

In this latter solution the whites are almost entirely freed of their yellow and grey tint; we say almost, and not entirely, because, as yet, that is still the drawback of this process. The paper retains, in the high lights, particles of carbon, which no doubt adhere to the invisible asperities of its surface, which had not been smoothed down in the preliminary pressing, or which arose from the moistening of the paper at the time of the application of the sensitive film. This is the chief difficulty which remains to be overcome, but not the only one: the half-tones leave something to be desired as regards roundness; in views, the most delicate portions of the distances are inadequately rendered, often being undecided and as if scraped, and the blacks want brilliancy and homogeneousness, especially in the middle distances.

Such as they are, however, these results, though incomplete, appear to us sufficiently remarkable to merit encouragement; it is precisely their sterling value which induces us to point out their imperfections. The simplicity of the process, the field for progress and practical improvements which it opens to the sagacity of inventors, inspires us with hope and confidence in its future. We resolved, therefore, to assign to Messrs. Garnier and Salmon a portion of the second prize.

There was one candidate respecting whom we could not insist on our rule that he should operate before our eyes, separated as he was from us by the sea—we mean Mr. Pouncy. We were, therefore, compelled to make the most conscientious examination possible of his formulæ, and then to put them in practice for ourselves with all the care we owed to this brother in the art, thus judged as it were by default. But even these precautions were not deemed sufficient. It was necessary to go further; and, to insure for the examination of Mr. Pouncy's claims every desirable guarantee of impartiality, we went through the whole of the operations of his process with our own hands, as well as that of Messrs. Garnier and Salmon, whom we thus placed on precisely the same footing, the same scrupulous care being observed by us in manipulating with both processes. These comparative experiments were made by us at Count Aguado's, no stranger being present.

We first tried Garnier and Salmon's method, with substances prepared and applied in the manner described above. We then operated by the Pouncy process, not less faithfully, according to the information furnished by him in a printed prospectus referred to in our *Bulletin* of January last.

As regards artistic merit, the results were found to be equal. Under other aspects we have this to point out: the manipulations are somewhat more simple and easy in the Pouncy process. It has the advantage of admitting the employment of the negative to print from, which gives rise to the hope of greater delicacy in the counterpart.

On the other hand, the insolation was more rapid in the Garnier process. One minute the first time, one minute and a half the second, sufficed; while in the Pouncy process it required four minutes and four minutes and a half. In both cases the sun was unclouded, though more or less intense.

As to the necessity of printing from a positive, it is but just to say that, in certain applications, this may constitute a real superiority; for example, when a considerable number are wanted for publication, for which it would be of great advantage to multiply the means of printing. Besides which, the use of positives sets aside the chances of accidents which menace the negative in the hands of operators.

These different considerations left the balance so nearly equal, that it appeared to us just and necessary to put the two candidates on the same line of footing, by assigning to each a recompense in equal proportions.

(To be continued.)

Photographic Notes and Queries.

THE EFFECT OF ATMOSPHERIC INFLUENCES IN THE PRACTICE OF PHOTOGRAPHY.

Sir,—I consult your journal weekly with a view of keeping myself informed of what is doing in photography; but upon one subject which I think is interesting, I do not see enough to satisfy me. Your correspondents are trying various camera-processes, wet and dry, and reporting upon their merits; they arrive at different conclusions, and I cannot but think that one cause of this discrepancy may be due to *variations in the actinic power of the light at the time of taking the pictures.* These variations effect not only the exposure of the plates, but also, in a more important manner, the action of the reducing agent in developing the image. It is not a question of whether you are to allow fifteen or thirty seconds in the camera; but rather of the quality of negative which it is possible to obtain by any exposure. On one day you get a good picture and on another an indifferent one by the same mode of proceeding.

Every experimenter in photography has, perhaps, indulged the hope of introducing a perfect process. He is

enthusiastic himself, and his friends are ready to encourage him, for it often happens in such cases that success attends his efforts at the outset. By and by, however, it is found that there are some weak points in this new process, and that under alterations of temperature or light, or slight modifications of the chemicals not at first insisted on, it is scarcely so successful as could be wished. A few repetitions of such experience makes the individual very cautious in pronouncing an absolute opinion, and if he obtains a fair picture under certain conditions, he will desire to test the same process under others as nearly opposite as may be.

I am led to make these remarks, as I said before, from having observed of late to how great an extent the working of the ordinary wet collodion process is affected by changes in the atmosphere, imperfectly understood. The spring, which is now nearly ended, has exhibited such changes in a remarkable manner, so that even practised operators have been occasionally at fault. A friend once observed, in a letter to me, "Do not attend to everything which people tell you about collodion; for it is quite certain that, using one sample only, you may get every quality of picture according to the state of the light."

It was, I think, at the latter end of April, or in the first week of the present month, that we experienced several days of cloudy weather, with the wind blowing from the east—thermometer at 50° to 52° Fahrenheit. During the whole of this time wet collodion negatives came out very pale and weak, although the exposure in the camera required to produce them was not excessively long. The developer, when applied, acted slowly, and often produced some kind of blurring or indistinctness. The colour of the deposit was invariably blue.

Suddenly, on a particular day, the aspect of things changed: the wind veered round to the west, the clouds parted, and the sun began to shine. The thermometer rose as might be expected, but only a few degrees, and certainly not enough to account for the differences in the result. The amount of photographic energy in the light at this time, I can only denominate by the term, *extraordinary*. It appeared as if all the chemical rays, previously bottled up somewhere, were now let loose, and that it was only necessary to coat the plate, and manipulate in any manner most convenient, to insure a good result. Collodion which had before been condemned as weak and useless—foggy baths—decomposed developers, &c., all worked harmoniously together. Spots, comets, streaks, and lines entirely disappeared, and even the severe criticism of our old correspondent, "Universal Success," would have been satisfied. So far, all was well, but curiously to relate, on this particular occasion those chemicals on which the operator had previously placed his principal reliance, began to give indications of failing him. The actinic force literally ran riot, and intense solarisation and over-action of light ensued. Here we see the wisdom of our friend's remark, "Do not believe everything which people tell you about collodion," &c.

Much has been said latterly of *bromides* in the negative process, and advocates and non-advocates of the use of bromide have been spoken of. Perhaps it will be expected that I should class myself in the latter division; but this I am not willing to do, for I must tell you candidly that, on the occasion referred to, I found the employment of bromides to be a great resource. The first application of the pyrogallic acid to the plate evidenced such an amount of rapid action as could only consist with solarisation under a bright light. These negatives might indeed, by a stretch of the imagination, be conceived to exhibit the natural colours, for the surface appeared red, blue, green, and of almost every tint of the spectrum. Evidently the *temperature* had not much to do with this peculiarity of development, for the thermometer rose only some six or eight degrees. The actinic force itself was in an exalted state; but the particular solution of this question, Mr. Editor, I will leave in your hands, knowing that your attention has been directed to the properties of the spectrum. As a practical photographer, however, I may make one observation, namely, that when it is discussed, whether experiments of a tentative kind should be made in a bright or in a feeble light, it would be better to say—try them in both. Does any new process, favourable in other respects, lack only energy in development? Then, perhaps, it will be a good process in a bright light, although it may not succeed so well in dull weather. Or, on the other hand, have the chemicals been prepared very much with reference to those cloudy days, which, unfortunately for photographers, abound in this climate; then be not discouraged because solarisation occurs when the sun begins to shine, but rather consider how far it is possible to alter the state of the solutions, and so to meet the enemy. There are many readers of the "PHOTOGRAPHIC NEWS" to whom this kind of advice is mere A B C; but some, it is hoped, who have not as yet become perfect, will accept a hint from your obedient servant,

F. HARDWICH.

SUGGESTIONS ON THE EMPLOYMENT OF WATER GLASS.

SIR,—I thank you for your attention to my note. One use to which I think *water-glass* might be applied is, as a protective glare to photographic pictures upon glass instead of varnish, which, if I rightly judge of its properties, seems feasible; but as I have not yet been able to procure the article, it is only a guess, and I need scarcely say that theory and practice should go hand in hand.

Should the above application be found not to answer, it would be serviceable to photographers as a cement for glass, in the case of broken baths, or the manufacture of flat dishes, or other articles which a photographic handicraftsman will readily make for himself. The uses to which it may be applied are multifarious, independent of photography. I have known, for some years past, of a method of painting termed Stereochromie, principally practised in Germany, as superior to fresco, wherein it forms the main ingredient.

Lately, I read an account of the formation of a company called "the Metropolitan Water-glass Company," for the supplying of water-glass, stating also that they had issued a pamphlet descriptive of its properties and uses.

INQUIRER.

[The following is the method of preparing "soluble glass" or "water-glass," as given by the inventor of Stereochromie:—Fifteen parts of powdered quartz are ignited with 10 parts of crude potassa and one part of charcoal (which decomposes and expels the sulphuric acid contained in the potassa) till perfect vitrification takes place. The hard, blistered, greyish black mass thus obtained is pulverised, then boiled with five times its weight of water (which dissolves slowly, but almost entirely in the course of four hours), and the solution is finally evaporated. If the residue on evaporation be heated till it fuses, it loses water and becomes a hard, transparent, rather fusible glass, which, on exposure to the air, absorbs so much water that it swells up strongly when heated. The substance obtained by simply drying the solution is colourless, transparent, and brittle, with a conchordal nitreous fracture, but softer than glass. It has a slightly alkaline taste and re-action, and, after thorough drying, contains 26 per cent. of potassa, 62 of silver, and 12 of water. The salt is permanent in the air; does not absorb carbonic acid from it; and effloresces only when accidentally mixed with other salts of potassa. In the fire it swells up from loss of water, then fuses and forms anhydrous soluble glass. Dilute acids decompose it, with separation of silica, more easily than concentrated acids. It dissolves but very slowly in cold, but readily in boiling, water.

A concentrated solution, containing 28 per cent. of anhydrous soluble glass, is syrupy, tenacious, somewhat turbid, and of Sp. Gr. 1·25. On boiling, or on exposure to the air, it becomes covered with a tough skin, which disappears when thrust beneath the liquid. After evaporation at a high temperature, it becomes very tenacious, and may be drawn out into threads like melted glass. It dries up to a varnish

when spread upon wood, &c., the combustibility of which it diminishes. A dilute solution absorbs carbonic acid from the air; a concentrated one, scarcely at all. From the above particulars, which are taken from a paper by M. Fuchs, the inventor,* our readers will see that soluble glass is likely to become a valuable adjunct to photographers, and we hope that the information thus given will enable "Inquirer" to pursue his contemplated experiments to a successful termination.—Ed.]

PRINTING PROCESS.

Sir,—Should you consider the following process for printing stereograms worth inserting in the "News," I can testify to its giving excellent results, and as the prints do not in the least decompose the fixing bath, there can be no deposit of free sulphur upon them, which is the main cause of fading. The formula for the toning bath was communicated to me more than twelve months since, and I have found it so good, that I never use any other.

I sensitise the albumenised paper by floating for five minutes on a bath of the proportions of 50 grains *fused* nitrate of silver to the ounce of distilled water. I find the fused nitrate gives richer proofs than a much stronger bath of the common crystallised. It soon, however, becomes discoloured, and when dark enough to tinge the paper, it should be filtered through kaolin. It should be kept in a bottle with a black covering, and in the dark, and the strength should be kept up by adding fresh silver occasionally. After sensitising, hang up the papers by American clips to dry, with a strip of blotting paper on one corner, and when dry put the papers into a book; they will keep good for two or three days in the dark room. Print *deep*, and wash in three waters; then soak for five minutes in water 20 ounces, ammonia, 1 drachm. Wash slightly, and tone.

The Toning Bath.—Put into an imperial quart bottle 40 ounces distilled water, to which add half an ounce of pure bichromate of soda. This is No. 1, and will keep any length of time.

Dissolve 15 grains chloride of gold in 15 drachms distilled water. This is No. 2, and should be kept in the dark.

For use, put 10 ounces of No. 1 into a bottle, to which add 1 drachm of No. 2. Tone to the required colour, and fix in a bath of filtered rain water, 20 ounces, hyposulphate soda, 6 ounces. Great care must be taken not to touch the toning bath with the fingers that have touched the hypo.; this is easily avoided. When the whites are perfectly clear, wash the prints in several waters, and soak for 24 hours, changing the water occasionally; then blot off and hang up to dry; when quite dry burnish the back of the prints with an agate burnisher.

This formula will, I think, be very useful to the amateur who may have but a few prints to tone at a time, as any quantity of the toning bath may be mixed—just sufficient for the number of prints—in the proportion of 6 minims of No. 2 to 1 ounce of No. 1; and as the bath will not keep, this is economical. When a small quantity only is mixed, the prints should be toned by pouring a sufficient quantity on to a clean plate of glass; place the print face downwards, and pass a glass rod over the back to drive out air bubbles; let it remain for a few minutes, then turn it, and keep the liquid evenly over the surface until toned.

Thomas Barrett.

THE FOTHERGILL PROCESS.—ACETIC ACID IN THE POSITIVE EXCITING SOLUTION.

Sir,—I should be glad to know if in the Fothergill process, after sensitising and then putting the plate in a bath of 5 grains to the ounce of nitrate of silver, it is necessary to use a two or three drachm wash, or whether this will render the plate less sensitive than the old-fashioned way of using the 4-drachm wash after the first (and only) bath? I prepared a plate to-day, and first sensitised it, then dipped it in a 5-grain bath till the oiliness disappeared, and then, without washing, poured over it gum water and chloride of ammonia; after drying, I took a first-rate portrait in *ten seconds* in a shady place. I have frequently taken them in thirty seconds with a half inch stop.

The chloride of ammonium with gum water is an immense improvement, as it reduces the exposure to one-half or a little less, but not so low as one-third, as a recent correspondent states.

I also find in the printing process that 5 drops of acetic acid to the ounce of silver in the nitrate bath, gives far better pictures than a neutral bath, but it renders the paper a *little* less sensitive. This is compensated for by its admitting of the paper being kept for several days, which a neutral paper will not do—to be *good*.

S. S. B.

SPLITTING SELENITE.

Sir,—I have a set of sheets of selenite for making objects for the polariscope, and cannot succeed in *splitting them evenly*. Can you advise me?

J. W. W.

[A particular kind of selenite is used for this purpose. It is found somewhere near Paris, and has more the appearance of mica than the ordinary selenite. A good plan of splitting it into even films, is to insert a sharp instrument at the edge so as to start the split, and then to insert a drop of spirits of wine in the split, and gently warm the crystal—the separation then spreads of its own accord. This, though a tolerably good plan, has never yielded us such large films as we have seen prepared by regular opticians. We believe there is a secret in the art of splitting sheets of selenite evenly, which is only known to a few persons.—Ed.]

THE FOTHERGILL PROCESS.

Sir,—Should any of your readers entertain a doubt as to the keeping properties of the "Fothergill plate," I beg to inform them, through the columns of your widely circulating paper, that in October last I purchased one dozen of these plates. I shortly after exposed and developed four, and the result proved satisfactory; not having time then to use the remainder, I put them aside. To-day, being at leisure, I have printed some positives on several of the same batch, and I find that in each instance the plate is as sensitive, and developes as quickly and free from stains as those used in October last. The time of exposure was four seconds in the shade. I do not know when these plates were made. I have had them in my possession upwards of six months.

N. T. A.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

Sir,—The dissolving away of pictures that your correspondent complains of, may be obviated by the use of another collodion and French spirit varnish. I had several good pictures spoiled in that way whilst using one particular collodion, but have never experienced the like result with any other collodion.

How far I may be correct, I can't say, but I attribute it to there being too great a quantity of alcohol in proportion to the ether in the collodion, and to the pyroxyline being very soluble in spirits of wine.

J. B.

THE HON. MAJOR FITZMAURICE'S NEW LIGHT.

Sir,—You have kindly given us information about the splendid new light of the Hon. Major Fitzmaurice, by inserting the letter of your correspondent from Blacklock; but that gentleman, though he tells myself and brother photos. that the Grand light can be packed in a portmanteau, and that the Domestic is the size of the moderator lamp, contrives to leave us effectually in the dark as to where this photo-

* Kastn: Arch: v. 385.

graphic treasure is to be seen, procured, or how made. I am sure your editorial pen could not be enlisted in a better cause than in the endeavour to procure some really tangible information on these points for your thousands of subscribers, of whom, I am sure, there are many who would most gladly avail themselves of it, as well as yours very truly obliged, W. L. C.

SUBSTITUTE FOR A GLASS ROOM.

Sir,—In reply to your correspondent "Beta's" note respecting the calico tents, I can inform him that my calico was brushed over with the solution of white wax and turpentine in May of last year, and remained exposed to the weather till the end of October, and was then perfectly waterproof. HENRY DOUBLEDAY.

ANSWERS TO MINOR QUERIES.

SYRUP OF IODIDE OF IRON.—*Scientia.* The following is a good formula for preparing this syrup:—Take of dry iodine, 200 grains; fine clean iron wire, 100 grains; water, 6 ounces; white sugar, in powder, 4½ ounces. Boil the iron, iodine, and water together in a glass flask, at first gently, to avoid the expulsion of iodine vapours, afterwards briskly, until about two fluid ounces of liquid remain; filter this quickly, while hot, into a flask containing the sugar; dissolve the sugar with a gentle heat, and add water to make up to six fluid ounces.

PORTABLE LEVELLING STAND.—*Emery.* Several ingenious and efficient levelling stands have been described in our columns; perhaps, however, the following one, for which we are indebted to a suggestion of Mr. Stewart, will be found to answer the desired purpose. Take three pieces of brass rod, about four inches long, and fasten them together in the form of an equilatural triangle, by means of long coarse threaded brass screws, pointed at the end. By means of these any vessel supported on the triangle can easily be brought to a level; and when required to be packed up, the removal of a screw will allow it to fold up into the compass of an ordinary pocket ruler.

CYANOGEN SOAP.—*F. R. W.* We do not know the composition of the article owning the above name, but the following is a very good receipt for a similar thing:—

Cyanide of potassium	1 ounce.
Iodine	1 drachm.
American potassa	2 ounces.

Powder the above well and then mix with them sufficient bath brick and water to make the whole into a paste; and preserve in a well corked bottle, and label "Poison."

DEPOSIT ON THE SURFACE OF PRINTS WHILE TONING.—*J. H. U.* The deposit upon the prints when toning in the gold bath, as described at p. 89, vol. i., and p. 15, vol. ii., may arise from not following out the directions there given. It is possible, though not very probable, that the chemicals are in fault, or the water contains some injurious salts. The most likely cause of such deposit is the ammonia in the print uniting with the gold, and so forming "fulminating gold," a yellowish brown substance, which is deposited on the addition of ammonia to the chloride of gold. Has J. H. U. suffered any ammonia to get mixed with the gold bath? or has he neglected to wash it from the ammonia before placing it in the toning bath? Not more than two or three drops of ammonia to an ounce of water should be used in the bath before toning, and it should then be washed for about one or two minutes—the gold and carbonate of soda should not be mixed with anything but pure water; and if these directions are attended to, and the results are not uniformly good, the chemicals are in fault.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

STEREOSCOPIC EXCHANGE CLUB.—Mr. J. E. Coward writes to us as follows:—"Dear Sir,—When I joined the Photographic Exchange Club, I stated to you that I was going to leave England in about a month; this period has now elapsed, and as I leave to-morrow, I think I ought to acquaint you with the fact—to prevent, if possible, any more being sent to my address without the chance of returning them, especially as I received one only yesterday. I must express myself thankful to you for having instituted a society of this kind, having received much courtesy from its members generally (as well as many most beautiful and interesting specimens), and wish I had the opportunity of returning them my thanks. With some few, in my new home (S. Africa), I have agreed to make further exchanges, and hope to obtain there some negatives of subjects distinct in their character from those obtainable here." Mr. J. Sang, of Kirkaldy, has also written to say that he wishes to withdraw his name. The following names of gentlemen who wish to join, have been forwarded to us since the publication of the last list:—J. Partridge, 146, High Street, Southampton. (Two or three pictures.)—Hugh Robert Rump, Wells-next-the-Sea, Norfolk.—W. B. Harwood, Chiddingfold, near Godalming, Surrey.—A. Nelson, 11, Upper Sackville Street, Dublin.—L. J. Gaskell, 14, Stanley Street, Macclesfield.—Alex. Henderson, 3, Inkerman Terrace, Montreal, America.—A. Taylor, Dunfermline.—J. Herdmans, Junr., Sion Mills, Strabane, Ireland.—David Storrar, Junr., High Street, Kirkaldy.—R. Mason, Bamber Bridge, Preston.—W. Child, Bushbury, Wolverhampton.

CERVUS.—1. Your pyrogallic acid is rather discoloured; but it will do very well for any but the most delicate photographic work. We have constantly used it in a similar state, without noticing any inferiority in the results. You will not be able to resublime it, as very great experience and special apparatus is required for that purpose. 2. Most large works on chemistry treat of the manufacture of benzol. It is obtained from coal tar naptha by distillation, the portion which comes over first being reserved for further rectification.

PIER.—Apply at the address of the French Photographic Society, Rue Drouot, 11, Paris.

CHLORIDE.—1. We cannot advise you whether to procure a license or not; it must depend on your own ideas on the subject. 2. A portrait lens used for landscape purposes, has a tendency to give an excess of light towards the centre of the picture. 3. Try the effect of adding a few crystals of nitrate of silver to your bath. 4. You may delay the fixing after your pictures are developed, for several hours, provided you wash the developing fluid well off the surface, and keep the plates in the dark.

H. BANKS.—There is too much water in the collodion; you cannot now remedy it, but must use another sample. The addition of carbonate of potassa would do harm rather than good, as it would destroy the tenacity of the film. Chloroform is of no use in such cases.

A SUBSCRIBER.—We do not think you will be able to increase the power of your telescope sufficiently to see Saturn's satellites or rings well. There is a limit to the magnifying power which an object-glass will bear applying to it; and in ordinary terrestrial telescopes this is soon reached. A method of finding the magnifying power of a telescope, was given in our first volume. By that, you will perceive that the application of a lens of a shorter focus to the eye end of the telescope, increases the magnifying power. In experiments of this sort, the telescope should be mounted on a very firm stand, and the different lenses used for eye-pieces should not be held in the hand, but mounted so as to form part of the instrument. An ordinary single lens will do for your purpose; but, for a first-rate telescope, a properly constructed eye-piece should be used.

NEVER SAY DIE seems to have become very soon discouraged at the failure. "Never say Die," but try again; good pictures *have* been fixed in that way.

BON-ACCORD.—We can only recommend you to consult our advertising columns; we cannot recommend particular makers.

A PUPIL.—If prepared in the way recommended by our correspondent e, at vol. ii. p. 15, the toning bath will serve for use until quite exhausted.

H. MORTON.—The print is a very good one in many respects. It might be a little improved by being toned rather darker; and by the light parts not being quite so intense.

C. A. E. W.—We think that if our correspondent were to add a little acetic acid to the silver bath (as recommended in previous numbers), the sensitive positive paper would not be likely to turn dark for many days, if it were kept in a well stoppered or corked bottle. Use the process given at vol. ii. p. 15.

PROTOSULPHATE.—A correspondent in our last number (p. 143) speaks very favourably of developing dry plates with protosulphate of iron.

X.—We have not tried the plan ourselves, neither do we think it would be perfectly safe; but we will inquire, and communicate the result to X. and our other readers.

P. M., Dunfermline.—Consult our previous numbers, advertisements, and matter. That is the best advice we can offer.

M. M. D.—Some parts of your letter we will insert in our Notes and Queries, as we think the hints will prove useful. 1. The process seems as if it would answer, from the description, but it is too recent for any practical experience to be brought to bear upon it. 2. Unslaked lime will absorb the water from alcohol without distillation; but it will be better to distil it off, as the spongy lime soaks up an enormous quantity of alcohol, which would, in that case, be recovered; and, also, the alcohol would dissolve sufficient from the lime to render it unfit for photographic purposes. 3. We have never tried the process, but have seen some very good things taken by its means.

HALCYON.—1. Distilled water should be employed. 2. If an oven be not at hand, some substitute must be used. 3. A single lens of a short focus. 4. We do not at present know more than is given in the author's description.

F. S. Y.—Received. Your wishes shall be attended to.

PHOTO.—Amber varnish is a very dangerous one to use; plates varnished with it are very liable to be injured by contact with anything at all rough; the coating of amber being very little protection against scratching. We prefer good spirit varnish, applied with heat.

S.—Your nitrate of silver evidently contains impurities; most likely nitrite of silver or nitrate of copper. In either case, it is unfit for photographic purposes.

Communications declined, with thanks:—S. Hunter.—A Beginner.—Oxymel—Stereo.—P. H. I.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Waxed Paper.—G. J. W.—A Friend.—W. C.—R. Collo.—Mephistophiles.—O. O. O.

IN TYPE:—C. T. H.—B. A. I.—Philoxymel.—Viator.—R. M. S.—Warregal. M. M. D.—Magnum Bonum.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book-parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 40.—June 10, 1859.

THE STEREOSCOPE.

BY M. CLAUDET.

At the sitting of the French Photographic Society on the 21st December last, M. Hermagis presented a new memoir on the subject of the stereoscope with parallel lenses, which, in ignorance of my previous labours, he presented to the Society about a year ago as a new invention; at which time I addressed a remonstrance to the Society, which was published in their *Bulletin*.

My title to this invention was so evident and incontestable, that M. Hermagis had nothing to say in answer, and he was forced to submit to that law of priority which forms the guarantee of inventors, and prevents confusion in the history of the progress of science.

The object of the new paper of M. Hermagis appears to be, not to claim the invention of the stereoscope with entire lenses, but to explain the advantages which he believes he obtains in this system, by adapting, before the lenses, two tubes of about 2¼ inches in height, intended to correct a fault which, as I shall prove, is entirely imaginary.

M. Hermagis imagined that to obtain the coincidence of the images, the lenses ought to be inclined, and that I had adopted this inclination by which, said he, "M. Claudet returns to the system he fights against, that is to say, he re-forms the prisms, because in inclining the axes of the lenses, the eyes are forced to look through the edge of the parallel lenticular system; it is by means of the tubes, which, acting as cameras, permit our eyes to be placed in the axis of the luminous cones emerging from the lenses, that the necessity of inclining the lenses is obviated. In adapting these tubes to the stereoscope, M. Hermagis thinks he has overcome these inconveniences, and if M. Claudet, using entire lenses, has been forced to incline them, it is because he places the eyes too near the lenses. This it is which establishes an important difference between the two systems."

What will remain of all this logic when I have proved that the system of entire lenses, in replacing the prismatic lenses, in no way requires that the axis should be inclined to bring the image to the centre of each retina, and that the best method of seeing through them is to place the eyes as close to them as possible?

When the lenses are placed parallel to the images, and their axes each coincide with the centre of the image opposed to it, the visual axes only require to be made parallel to obtain the coincidence of the two images. We look through the stereoscope, as if we were looking at a distant object through an opera-glass. In both cases the visual axes are practically parallel, and it is not more difficult to give them this direction on looking into the stereoscope, than it is on looking through the opera-glass. In this position of the visual axes, each image is represented on the centre of the retina opposed to it, and from this coincidence of the two images on the centres of the two retinæ, arises the stereoscopic effect. Nothing is so easy as to place the visual axes in a parallel direction; it is only necessary for a man to imagine that he looks at an object right in front of him at some little distance off. We soon get familiarised to this method of looking through the stereoscope with entire lenses, and it is, in fact, much less fatiguing than looking through the prismatic lenses; for the refraction through this small angle does not suffice to conduct each picture to the centre of each retina; it is necessary, besides, to strongly converge the optical axes.

On careful reflection, M. Hermagis will see that he is entirely in error as to the influence of his tubes, and as to the necessity, when he does not employ them, either of inclining the lenses to obtain the coincidence of the images, or of placing the visual axis in the edge of the parallel lenticular system. Is it not evident, on the contrary, that to look at those points of the images most distant from the centre, the closer the pupil of the eye is to the lens, the less it will have to look through the edge of that lens, and the more distant it is from it, the more the optical axes will have to be inclined to the right or left; consequently, the more they will have to pass through the edges. Hence M. Hermagis's tubes, instead of preventing the visual axis from impinging on the edges of the lens, will actually produce that effect. It is impossible to deny it. The tubes which keep the eye at a distance from the lens, have the additional inconvenience of augmenting the spherical aberration, inasmuch as the edges of the image are refracted by points distant from the centre of the lens, the only point entirely exempt from aberration.

In another part of his memoir, M. Hermagis states that it is possible to obtain *the stereoscopic effect by the coalescence of two perfectly identical images.* Such a result is impossible, and I shall not find much difficulty in proving the fallacy of such a statement.

When we look with both eyes, natural objects appear separated from each other, and appear in their real relief in consequence of the sensation produced by the different degrees of convergence of the optic axes necessary to make the similar points of the two perspectives gradually coincide on the centres of the retinæ. Every distance of an object has its peculiar degree of convergence. The greater the convergence, the less the distance; and the less the convergence, the greater the distance. This sensation gives us the perception of the distances belonging to each degree of convergence of the optical axes, in such a degree, that if by artificial means, for example, by the use of the pseudoscope (or even the stereoscope, by reversing the positions of the pictures), we conduct the left image to the right eye, and the right image to the left eye, we are obliged, to obtain single vision of the different objects, to converge the optic axes, to a *greater* extent for distant objects, and *less* for those near at hand. This effect being contrary to that to which we are accustomed, reverses in our judgment the order of perception of distances, because the judgment persists in attaching to each degree of convergence the idea of distance proper to it in the natural order of our sensations. Consequently, everything is inverted; the more distant objects appear nearest, and the nearer the more distant.

The pseudoscope, invented by Professor Wheatstone, the illustrious inventor of the stereoscope, is an instrument of the highest importance in the study of binocular vision, and in the investigation of the phenomena it produces. It gives the means of proving the cause of stereoscopic relief, by presenting an entirely opposite effect by the same law of convergence.

If we examine either in the stereoscope or the pseudoscope two precisely identical images, the effect is the same in both. There can be no sensation of distance, for the reason that, in examining similar points of the two pictures, the convergence of the optic axes has not to undergo any variation,

and all the planes being seen with the same degree of convergence, the resulting sensation can only give the idea of one distance alone.

We can no more obtain the stereoscopic effect by the coincidence of two precisely similar images, than by a single image. It is evident that two identical images depicting themselves one on each retina, or a single image represented on both retinæ, are in fact, precisely the same thing. In both cases each retina has the same image, the same perspective, and it is impossible that a single perspective can produce the least sensation of relief. If we examine two impressions from the same negative of the moon, or two impressions of two negatives taken at the same moment, or if we look at the moon itself, the effect in all cases is the same—that of a flat disc, without the slightest appearance of relief. No effort of the imagination can make the moon appear to us in a spherical form so long as the retinæ have the same perspective of that celestial body. But by availing ourselves of the phenomenon of the libration of the moon, as M. Warren de la Rue has so ingeniously done,* we get two pictures presenting two different epochs—two different positions: each has a peculiar perspective; and these two pictures combined in the stereoscope enable us to obtain the moon in a spherical form. But, if we look at these same pictures with the pseudoscope, the image will appear concave instead of convex.

The sensation which we experience on looking at a painting or photograph is not, it is true, without a certain illusion of distance, but this sensation is not at all stereoscopic. It is even curious to remark, that this kind of illusion is greater when we look with a single eye than when we look with both eyes. The reason of it is that, when we look at a picture with a single eye, it is under the same optical conditions as when we look at a landscape with a single eye; while, if we look at it with both eyes, we become sensible of the inaction of the angular play of the visual axes by glancing at all the parts of the picture—an inaction which destroys the degree of illusion we experienced when using only one eye, and proves to us that, instead of a real landscape, we only see a painted surface quite close to us, which we perceive to be uniform, from the constant uniformity of the degree of convergence which we employ in glancing at all the points of the picture.

I observed with pleasure, that the Abbé Moigno, one of the most competent authorities on a question of optics, replied to this singular assertion of the production of stereoscopic relief by the coincidence of two identical images, by saying, that it "in no way agreed with the theory of the stereoscope, and that the sensation of stereoscopic relief with two identical pictures was an impossible effect."

M. Quinet, who took a part in the discussion after the reading of M. Hermagis's memoir, appears to ignore the principle, the construction, and the effects of my stereoscope with entire lenses. I hope this paper will satisfy him that it is he *who is in error*, when he denies the perfection and advantages of the stereoscope with entire lenses, which represents the vertical lines in their natural regularity; while the prismatic stereoscope, as I have shown, bends all the vertical lines, and makes plane surfaces appear as if they were concave.

* And Mr. Fry (see vol. ii. p. 75).

NEW PROCESS OF PHOTOGRAPHIC ENGRAVING.

BY M. BERCHTOLD.

In our last number we published a brief description of a process of heliographic engraving, the invention of which is due to M. Berchtold, in which the powdered resin is replaced by a system of hatching applied photographically on the metallic plate. Here is the description as communicated to us by the inventor:—

In M. Berchtold's process, the work of engraving is produced photographically, and the number of the lines varies according to the requirements of the model, and that without the intervention of the will of the operator: light itself distributes these lines, and places here five or six, there four, three, two or one, and converts them even into a hatching, according as the tones are more or less black.

The process applies equally to the different methods of heliographic engraving, photolithography, and the engraving of daguerreotype pictures on silver plates.

When the heliographic image is formed on the metallic plate, and before any solvent is applied, a glass coated with black varnish, and covered with a multitude of parallel and equal hatchings traced by means of a point which removes the varnish, is laid on the plates, which is then exposed to the action of light for a period equal to that which was required to produce the picture; this operation is repeated several times, and in every position, care being taken (*and this is the important point*) to vary the time of exposure: thus, if the first exposure was ten minutes, the following ought not to be more than four, three, two, one, or even half and a quarter of a minute.

In this way, these lines are not equally produced on all the parts of the picture, the varnish having already undergone a modification according to the intensity of the light which acted upon it in the first instance, and the luminous actions of the successive exposures combining with this first action according to its intensity.

An analogous result may be arrived at by making, by means of this streaked glass and by ordinary photographic means, a transparency, the hatchings of which crossed in every direction shall be of a different intensity, in consequence of a difference in the time of exposure to the light; and this transparency, applied only once on the metallic plate covered with a sensitive coating containing the invisible image, will give the same result as the successive exposures spoken of above.

A transparency formed by the photographic reproduction of a plane surface, covered with equal and parallel channels, gives also a very satisfactory result; these channels, forming a hatching of a graduated tone, passing from black to white, have the property of reproducing themselves on the metallic plate, already bearing a picture on its surface, with different widths according to the intensity of the tone, and thus renders the model with all its delicacy. The same result may be equally well obtained directly on the photograph before the heliographic operations.—*La Lumiere.*

THE PRESERVATION OF NITRATED PAPERS.

We announced in our number of last month that a demand for the discharge of a patent taken out by M. Marion was about to be made by Messrs. L. and H. Wulff. We are happy to state that the parties have come to an honourable understanding, and that Messrs. Wulff, from explanations that have been given them, have arrived at the conviction that it was Messrs. Davanne and Girard who brought the properties of chloride of calcium to the knowledge of M. Marion; morever, in his patent, and more particularly in the addition made to it on the 16th February last, M. Marion declared that his invention consisted especially in the slide intended for holding the preservative substance. This slide has, in fact, the advantage of being available independently of the box, and is not injured by displacement or locomotion. In the face of these explanations Messrs. Wulff at once abandoned their intention.

The means of preserving positive papers has always been considered an important desideratum, and has occupied the serious attention of most of our principal photographers, who have been more or less successful in finding means of impeding the colouring of nitrated papers. M. Laborde, who occupies a foremost place among photographers, made an exceedingly interesting communication on the subject to a scientific journal, which we are sure will be read with interest:—

"The rapid colouring of nitrated positive paper arises less from the action of the air and the mutual reactions of the substances it contains, than from the emanations of every kind to which it is exposed without our perceiving it.

"If a piece of nitrated paper be inclosed in a thoroughly clean bottle, and the cork used to close it has been used for some other purpose, it is very rare indeed that that part of the paper does not become deeply coloured which happens to be nearest to it. If a prepared paper be left for several days in the dark room, in the midst of different substances, it often shows different degrees of colouring, according to the emanations it has received on the various parts. In short, since a simple paper exposed to the sun and afterwards inclosed in a tube suffices to colour a sensitised paper, one may readily conceive how many different causes there are capable of producing this discolouration. In citing this latter cause, I must observe that I have no intention of giving a peremptory opinion on such an important question, and of attributing to emanations an effect which M. Niépce regards as the result of radiations. I confess, however, for my own part, that I have some reasons for not admitting the effect of obscure radiations on the paper. However this may be, here is the simple method I have adopted for preserving nitrated paper, not for an indefinite period, but long enough for ordinary practice. When the paper is thoroughly dry I inclose it between two parallel glasses. By placing these plates of glass one over the other, the nitrated papers are pressed closely together like the leaves of a book, which to a great extent cuts off the access of external agents. The discolouration of the paper is likewise retarded by placing it in a bottle with a few bits of camphor; whereas, what would scarcely be expected, the presence of acetic acid under the same circumstances accelerates the colouring. Bromine, chlorine, and hydrochloric acid in a very small quantity, preserve nitrated papers for a considerable period; but, as they modify the sensitive surface, they can only be employed with a view to certain effects."

M. Humbert de Molard, whom we may consider an authority in photographic matters, has assured us that he has preserved nitrated paper for a lengthened period by simply putting them between sheets of paper damped; this being the case, it remains to be discovered why it is that paper, which, according to recent discoveries, can only be kept in a place which is absolutely free from moisture, is equally well preserved under totally opposite conditions.—*Revue Photographique.*

THERMOGRAPHY.

The idea of having recourse to heat as an agent for reproducing pictures, designs, print or manuscripts, has occurred also to M. Gaultier; he even told us, though rather too vaguely for us to speak of it, that he had prepared, for one of his sons, sheets of sensitised paper by means of which, with the aid of heat, this young man had been able to obtain, with great ease and facility, copies of ancient and valuable documents which it would have been difficult to have copied by hand; and which would, besides, have taken too long a time. Our readers will remember that M. Gaultier embodied his idea in a note which he deposited, on the 7th March last, in a sealed envelope, in which it was stated that "Papers sensitised with the aceto-nitrate of silver, with nitrate of uranium, with a mixture of gelatine and bichromate of potash, placed for a greater or less length of time, from twelve minutes to an hour, under a sheet on which characters are traced, and heated to from 212° to 250°, reproduced those characters perfectly if they were traced in black ink, but only faintly those traced in red ink."

M. Niépce de St. Victor having been somewhat alarmed lest M. Gaultier should claim priority over his thermographic experiments, took care, in his last memoir, to prove, by authentic documents, that his first essays were made previous to January of this year. M. Gaultier writes to say that he has no desire to dispute the prior claims of M. Niépce, but it seems to him that he may fairly lay claim to the merit of having conceived a similarly happy idea, and having realised it by applying it to the reproduction of old and original writings. If M. Gaultier reads *Cosmos* he ought to have seen that an American, a Mr. Page, had realised a similar application, on a much larger scale, before him; that the first thermographic reproduction of imprints dates back more than ten years; and that the merit of it is due to Mr. Draper of New York.—*Cosmos.*

Critical Notices.

Painting Popularly Explained. By Thomas John Gullich, Painter, and John Timbs, F.S.A.

This is one of those little treatises which appear every now and then from the pen of Mr. Timbs, in which he treats the subject of painting in that popular style peculiarly his own. Throughout the whole volume it is not difficult to trace the hand of Mr. Timbs; he brings, as usual, from his well-stored memory those little extracts, which contain in a nutshell the essence of the subject treated. We must congratulate Mr. Timbs on his good fortune in securing the services of such an able colleague as Mr. Gullich; in the preface to the present volume that gentleman very modestly says:—"The inquiry may possibly, and not unreasonably, suggest itself—how it happened that one of the authors of this volume, to whose name 'painter' is attached, did not prefer, like Annibale Carracci, 'only to speak by works.' The answer to this is, that in him, as in many others, the natural tendency was nearly equally strong to literary as to artistic pursuits. And the observation may be ventured, though at the risk of provoking unfavourable comparisons, that many painters have been better known by the productions of their pen than by those of their pencil. In this instance, however, his literary efforts would probably have been confined to contributions to periodicals, had not an accident occurred to him which, though it compelled for a long period a comparative cessation from the practice of art, did not prevent his undertaking, with a former literary associate, a task, the accomplishment of which, they trust, will serve some useful purpose." While Mr. Gullich may not be so widely and generally known to the world at large as some of his brethren, yet he has produced works "which speak for themselves." We are sure that none of our readers who had the pleasure of visiting the Manchester Art Treasures Exhibition, could have failed to notice the glorious collection of miniatures, ancient and modern, which was there displayed. And in the modern series not the least noticed were those exquisitely finished ones by Mr. Gullich, especially that one of his present "literary associate." This fact is sufficient to show us, that, whatever opinion is expressed in the work before us on the subject of art, it is given by one who thoroughly understands his subject. Although the present volume is—in comparison with the large subject of which it treats—but small, yet it contains as clear and as succinct an account of the history of the art of painting as any work extant. That there may be more elaborate and eloquent treatises we grant, but all other works are more or less special in their characters, while this "popular history" is universal, and embraces the history of art from the earliest ages down to the present. As we have above remarked, it is easy to see Mr. Timbs' contribution in the extracts which are to be found. And we may here remark that the subject is illustrated much more forcibly than could even be done by a strictly original treatise. The compilation system, as practised by Mr. Timbs, is now extremely popular, as it saves the student the immense labour of having to peruse heavy works which possibly only contain a few extracts at all instructive. The chapters on miniature painting and coloured photographic portraits are especially interesting; and as it would be too long to treat of them in the present notice, we may possibly return to the subject in another article. Meanwhile we recommend to our readers the perusal of this extremely interesting little volume.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued).*

What remains now to be done is simply to take pure lake, black and medium, thin, and to glaze or shade between the aforesaid body-colour half tints and the intense shadows in your picture, where the transition from light to shade appears too sudden, for the purpose of rounding up the folds.

Do not allow the edges of your coat to cut black against the background, but softly edge it with light. However, if the dark guide lying beside you is strictly adhered to in these respects, the result must be correct.

In all cloths the same process must be adopted, or the following, which, however, is not so effective, but is easier of management:—Take a semi-transparent wash, say (in case of black cloth) ivory black and a little white, mixed to the required tone, wash over the whole; when dry gum over; then, with a sort of half tint, made of lake, indigo, and sepia, wash in the general anatomy of the folds. The same colour, with sepia added, and gum, may serve to touch in the deepest shadows.

In either method you use opaque colours for the lights, and transparent ones for the shadows.

Camel hair pencils are better for painting cloth; sables, being harder, are liable to leave markings, although for every other process sables are far preferable.

Curtains, and any other objects meant to recede, are made to sink into a background, by being painted thinly over, after the background is nearly finished.

Velvets.—The peculiarity of velvet is its roundness of folds, the intensity of shadow, and those shadows falling on that which in cloth fabrics would be lights, whilst the bright lights appear on the edges of folds; which latter peculiarity results from its tendency to absorb light. In the finest qualities of velvets these peculiarities are in excess.

Silks and Satins.—Satin is distinguished from silk by the heavy richness of its folds, the large and square breaks in the fold, which are broader than those of silk, the high lights, and the pure intensity of its jet-black transparent shadows. Silk, being thinner, is sooner broken in form, and, is consequently, full of every species of angular sparkling lights. It has a greater number, and therefore smaller folds.

Muslin well painted is always an agreeable object in pictures, from its transparent nature affording opportunity for much soft delicacy of colouring, as all objects appearing through it become chastened by its whiteness. The general colour of muslin is pure white in the lights, bluish half tints, thin purply tints between these and the shadow, and the shadows a soft pale grey; but the deep shadows will partake more than any other part of the colour of whatever object is underneath the muslin, because it reflects the least possible amount of its own colour there, and only shows that which is underneath. It has ever been considered difficult to paint muslin; and, we believe, from the fact that many painters do not consider sufficiently well its nature.

Indeed, there is every necessity to philosophise in everything upon which we are engaged; and never more so than in matters of art. And wheresoever a difficulty presents itself, a little reason will be found to be worth much practice.

There are people who, from extreme practice, get to paint certain things tolerably well, mostly by imitating others, but not knowing the real nature of what they attempt to do, they never get beyond a limited point of excellence.

Those who rise to excellence, are men of thoughtful character, who have a definite reason for every touch they give a work, who see and know why certain appearances in nature do exist. Those are modest men, too, for they do not attempt subjects of which they are ignorant.

In truth, it is found that a good artist, one who deserves that name, is a man of almost universal knowledge in things relative to nature and natural science, whether by intuition of genius or education.

END OF LESSONS ON COLOURING.

Dictionary of Photography.

CONVEX.—Rising on the exterior surface into a spherical or round form. Opposite to *concave*. A plano-convex lens is bounded by a plane surface on one side, and a convex one on the other. A double convex lens is bounded by two convex surfaces.

COPAL.—A resin which exudes spontaneously from the trees *Rhus copallinum* and the *Elæcarpus copaliferus*. A third variety is also found on the coasts of Guinea, where it occurs in the sand in the neighbourhood of rivers. Gum copal is met with in the form of large, colourless, or slightly yellow lumps, opaque at the exterior, but transparent within. Sometimes it is darker, and contains insects inclosed within its substance. It is slightly heavier than water, is hard, inodorous, and tasteless, and breaks with a conchoidal fracture. Submitted to the action of heat it fuses, but at the same time decomposes, and enters into ebullition evolving aromatic vapours. In the ordinary state, it is only slightly soluble in absolute alcohol; but when boiled in it, it swells up and becomes viscid and elastic. In order to effect a complete solution, it is necessary to suspend it so that the vapour of boiling alcohol may act upon it: it then gradually fuses, and falls drop by drop into the liquid beneath, where it dissolves. It is said that this method succeeds better if the alcohol contains camphor dissolved in it. Some species of gum copal, however, refuse to dissolve with this treatment. Copal swells up and dissolves completely in ether. If it be allowed to remain in ether until it has swollen into a thick syrupy mass, then heated to ebullition, and mixed with small quantities of warm strong alcohol, the resin dissolves, on agitation, into a limpid liquid, which will now bear diluting with alcohol in any proportion. If, on the contrary, cold alcohol had been added, in quantity, at first, the mass would have coagulated, and have refused to dissolve. Copal dissolves in about 100 times its weight of petroleum, and in a rather less quantity of turpentine. When copal is fused, it becomes endowed with quite different properties. During fusion, it evolves a volatile oil and water, and the residue then dissolves perfectly well both in alcohol and in turpentine. The solution in the latter substance is often mixed with a drying oil, and then yields a hard, colourless, and transparent varnish. The best way to obtain this solution is, to place the copal, broken up into pieces the size of a pea, in a flask, and heat it gently until all the copal is fused, but in such a way as does not allow of its becoming brown. Turpentine, heated to about 120° Fahr., should now be poured, in small quantities at a time, on the melted copal, taking care to stir well the mixture. If the copal be added at once to the turpentine, it would coagulate and become insoluble. Gum copal is a very complicated mixture; no less than five distinct resins having been discovered in it. And as each of these possesses different properties, and are present in very varying proportions in any particular sample of gum, it is not to be wondered at that the accounts of its behaviour with solvents, &c., vary so much with different manipulators.

COPPER.—A well-known metallic element of a reddish colour. As this metal has been fully treated of on a previous occasion, we will not further occupy space by re-describing it here. One of the most important applications of the compounds of this metal to photography, consists in the preparation of a solution of cellulose, by dissolving cotton, &c., in oxide of cuprammonium. For the full account of this remarkable discovery, see the "PHOTOGRAPHIC NEWS," vol. ii. p. 39.

CRYSTALLISATION.—We have already at vol i., p. 235, given an account of this process, and we therefore need not further allude to it here.

CYANIDE OF POTASSIUM.—This important photographic chemical is usually met with in the form of hard, white, fused lumps: these, however, are not by any means the pure salt, as in the process of manufacture large quantities

of carbonate and cyanate of potassa are formed. In perfectly dry air these lumps are inodorous; in the moist state, however, they smell of hydrocyanic acid from the action of carbonic acid in the air. It has a strong alkaline reaction, deliquesces in the air, and dissolves abundantly in water. Its aqueous solution may be kept unaltered in closed vessels at ordinary temperatures. It is almost insoluble in absolute alcohol. If a lump of the fused salt be left exposed to the air at ordinary temperatures, it gradually absorbs carbonic acid, gives off hydrocyanic acid, and is converted into carbonate of potassa. The energetic action of cyanide of potassium upon silver stains, and in dissolving insoluble compounds of silver is too well known to need more than a passing allusion.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, June 7, 1859.

A CURIOUS book has just been published in Paris, called "Le Vieux-Neuf (the Old-New), or Ancient History of Modern Inventions and Discoveries," by a certain M. Edouard Fournier. It forms two small thick volumes, elegantly written, and although the work is not only incomplete but unjust, the author has evidently bestowed much pains upon it. Instead of being a history of inventions and discoveries, as it pretends to be, this book is merely a collection of curious ancient facts, more or less authentic, joined together without method, most of the work having been done before by Beckmann, and if we took all the facts it contained for gospel we should, sooner or later, feel anew the strength of the old proverb, *Errare humanum est.*

Indeed, we should not have noticed the work at all but for a chapter on photography, which occupies two or three pages of the first volume, and which may, perhaps, amuse our readers. The author endeavours to show that the daguerreotype was discovered in 1760, by a certain Tiphaigne de la Roche.

We should notice here that almost every invention of importance which is treated of in the book before us is put down to the French. Thus, the steam engine was invented by the French!—the electric telegraph by the French!—the railway by the French!—vaccination by the French!—and so on. Most wonderful people—most ingenious author! These volumes form a true parallel to those published in such a large quantity by M. Figuier, which treat of *modern* discoveries, and in which, among other absurdities, we are informed that the *town* of Boston (in America) was one of the *authors* of certain medical discoveries relating to ether! But to return to our tale:—It would appear that Tiphaigne de la Roche published a book in the year 1760, and he called this book "Giphantie," a title composed of the letters which form his own name. In the eighteenth chapter a scene is described in a palace belonging to some Genii, the chief of whom addresses himself thus to the author of the work:—

"Thou knowest that the rays of light reflected from different bodies paint themselves upon any polished surface, for instance, on the retina of the eye, on water, on glass. The Genii have endeavoured to fix these passing images. They have composed a subtle and viscous matter which dries very rapidly and hardens, by which a picture is produced in the twinkling of an eye. They spread this matter upon a piece of linen and present it towards the objects they wish to paint. The first effect of the linen is that of a mirror; one sees upon it all bodies, far and near, of which light can bring the images.

"But—that which a mirror cannot do—the linen, with its viscous coating does, it holds fast these images. A mirror reflects faithfully all objects, but retains none; our linen reflects equally well, but, moreover, holds them all. This printing of images takes place the first instant that the linen receives them; the latter is then immediately taken away, and removed to a dark place. [This passage tends to show that Tiphaigne had really made experiments with the *camera oscura*, used by Porta, in the sixteenth century, and discovered rather earlier by Leonardo de Vinci.] An hour afterwards the viscous layer is dry, and thou hast a picture, so much the more valuable, that no art can imitate the truth of it, and no amount of time efface it. [From what follows, it would appear that, not only the mere outline of objects, but their *colours* also were produced.]

"We take, from their purest source—from the body of light itself—those colours which painters extract from different materials, and which time never fails to efface. The precision of the drawing, the variety of expression, the lights and shades, the perspective, all this we leave entirely to nature, who, ever sure in her operations, traces upon our linen images which, whilst they strike the eye, confound reason, and make us doubt whether what are called realities are not mere phantoms, which impose upon sight, hearing, and feeling, or upon all the senses at once.

"The Genii then entered into certain physical details. First, relating to the nature of the viscous body which intercepts and retains the rays of light; secondly, on the difficulty experienced in its preparation, and the method of employing it; thirdly, as to the reflection of light upon this dried substance. . . . . Three problems," adds Tiphaigne, as if awaking from his vision, "which I propose to the physicists of our days, and which I leave to their sagacity."

But, even if Tiphaigne had really made any experiments tending towards photography, they, like many of the other discoveries attributed by M. Fournier to the French, were *not* the first of the kind. Our laborious friend, M. Jobard, director of the Belgian *Musée d'Industrie*, whose book in four volumes, "Les Nouvelles Inventions," is almost as full of errors and nonsense as the volumes of M. Fournier (who has borrowed very considerably from the former)—M. Jobard, we say, affirms that an old book, translated 300 years ago from the German, was found lately in Russia, and that this book (the title of which is not given) contains a description, with figures, of the electric telegraph and of photography. Again, among the old alchymists, Fabricius, as early as 1566, in his work, "De Rebus Metallicis," assures us that by means of a lens, an image of any object can be obtained upon *horn-silver* (chloride of silver). He knew that the white parts of the object were represented upon the chloride of silver in black, the half-tints in grey, the black portions being left white.

If M. Fournier had gone far enough, he would doubtless have attributed Talbot's invention of photography on paper, and Archer's invention of the collodion process, to French photographers, but he has only touched upon the subject to relate the above passage.

As we are speaking of books, old and new, we will mention the title of another which it gives us much pleasure to notice, and which we should delight to see translated into our mother-tongue. The work in question is called "Lettres sur la Création Terrestre" (Letters on Terrestrial Creation), by Dr. Ph. de Filippi, Professor of Natural History and Zoology in the University of Turin.* We have expected the arrival of this book for some time past, and we are truly rejoiced that it has at last made its appearance. Dr. Filippi wrote it in a series of letters to his daughter; they were never intended to be read out of the author's family circle, but accident has altered the case. Letter by letter was translated into French and published in some of the Paris papers. The present edition is entirely new, and reminds us at once of Liebig's admirable "Letters on Chemistry," and Johnston's well-known "Chemistry of Common Life." Its field of investigation is, however, much wider than either of these.

We have frequently heard our non-professional friends

* Paris: Lieber and Faraguet, Editors, Rue de Seine, 13. Translated from the Italian by M. Armand Pommier.

complain of the difficulty they experience in reading Humboldt's great work "Cosmos; or, a Physical Description of the Universe." Had they known the modest little volume of Dr. Filippi, a good deal of the rough ground would have been made smooth for them. These "Letters on Terrestrial Creation" form, indeed, an excellent introduction to works of a similar nature, but of a higher order.

The author passes elegantly and smoothly from one subject to another, until he has embraced in his little 8vo volume the entire terrestrial creation. Beginning with the physical description of the earth, or geographical science, he glides on to its atmosphere, its water, its chemical elements, and emerges quietly from these to unfold the mysteries and beauties of mineralogy and geology; thence to palæontology, botany, and zoology.

The distinguished professor of the University of Turin has not produced a mere compilation of known facts, methodically arranged; he has written a work which cannot fail to be understood and appreciated by all classes of readers, and in which, at the same time, the man of science himself may pick up, here and there, a novelty, or be reminded in a few elegant and easy phrases of phenomena formerly more familiar to him.

While perusing this pleasant little work, the thought struck us that if such a text were only familiar to every one, how much strife, misery, and misanthropy would be for ever prevented! What a different aspect humanity would take if men could only be taught to study and admire the works of their Creator, and to abandon the follies of their sordid ambition!

M. Gaultier de Claubry, according to our Paris contemporary *Le Cosmos*, is continuing his researches in thermography, or the art of engraving by heat. Lately, it appears, he prepared for his son, who is an excellent Greek scholar, and a pupil of the French school at Athens, some sheets of sensitive paper, by means of which the young man has been enabled to obtain, with rapidity and ease, copies of some old and precious Greek documents, which it would have been far too tedious and difficult to have thought of copying with the pen. M. Gaultier de Claubry writes to the Academy of Science here, to explain that by desiring his sealed packet to be opened some weeks ago (as we noticed at the time), he had no idea of claiming any priority over M. Nièpce de St. Victor, relative to the discovery of the process; but he (M. Gaultier thought that the slight honour of having been the first to apply this discovery to useful purposes would not be refused him. *Le Cosmos*, however, shows that before M. Gaultier's ingenious applications were made, an American, Mr. Page, had already realised the problem on a large scale, and that the person to whom we owe the discovery of thermography, or the art of taking images by means of heat, is Mr. Draper, the distinguished physicist of New York.

M. E. Royer has lately made known some experiments on the crystallisation of sulphur. We will endeavour to tell them here in a few words:—Sulphur is known to take two distinct and incompatible forms according as it has crystallised after fusion, or from a solution.

Thus, sulphur which is allowed to cool in the crucible in which it has been melted, forms long prismatic needles with which we are all familiar. But if the same substance be dissolved in a liquid (sulphide of carbon, essence of turpentine, &c.), it will deposit, by evaporation, beautiful octahedrons—a form belonging to quite another system of crystallisation.

Now M. Royer has shown, by some very interesting experiments, that sulphur may be made to deposit *prisms* from a solution, if care be taken that the liquid from which it crystallises cools very rapidly, or be kept for a long time at a high temperature; whereas, if this liquid be made to cool slowly and gradually, octahedrons alone will be produced.

The liquid M. Royer experimented with is essence of turpentine, which is known to dissolve sulphur easily.

Having, for instance, dissolved a certain quantity of sulphur in boiling essence of turpentine, the liquid was immediately divided into two portions, A and B. A was made to cool rapidly, and deposited long prisms. B was cooled as quietly as possible, and deposited octahedrons alone.

By varying these experiments in a great number of manners, it is shown that prisms are deposited at about 100° or 108° (Centigrade), that is, a little above the boiling point of water. If octahedrons of sulphur are dissolved, the liquid will give prisms or octahedrons, accordingly as the cooling takes place rapidly or slowly. Moreover, if this liquid remain saturated with sulphur for some time at a temperature of 100° to 108° (Cent.), a mass of prisms are obtained, and not a single octahedron.*

These experiments remind us of those formerly made by other philosophers on calc-spar. If carbonate of lime crystallises at a low temperature, we obtain rhombohedrons, that is, common calc-spar. But if the carbonate is deposited from a heated liquid we obtain prisms of aragonite. This is the reason why the carbonate of lime deposited in steam-engines is aragonite and not calc-spar, as has been shown in "The Geologist," vol. i. Aragonite, even when indistinctly crystallised, is easily distinguished from the other variety of carbonate of lime (calc-spar) by its property of scratching the latter.

Another curious property which we will notice *en passant* is, that if aragonite be heated before the blow-pipe, its prisms break up with a crackling noise, and little rhombohedrons of calc-spar fly off. In making this experiment, a small sample should be chosen, and the eyes partially closed; a large sheet of paper should also be spread upon the table, to collect the little rhombohedrons as they fall.

M. Charles Martius, the distinguished botanist of Montpellier, informs us that he has discovered among some notes taken during several scientific excursions made by him at different times, a striking proof of the correctness of a theory he propounded some time ago, namely, that on mountain ranges the soil must be heated by the solar rays to a greater extent than the air; whereas on plains the contrary should be observed.

The fact is, that the rarefied air of mountainous elevations allows the rays of the sun to increase the temperature of the ground to a greater extent than the rays which fall upon the soil of a plain after having traversed air which is more condensed.

Thus, on the Alps, for instance, amidst the glaciers of Mont Blanc, at 3,050 mètres above the level of the sea, on the 22nd of July, 1846, the temperature of the air in the shade was 9°.4 (Centigrade); in the sunshine it was 11°.4; whilst the schisteous rock on which M. Martius stood, and the soil in which a variety of plants grew, showed a temperature of 29°.

These observations bear principally upon geographical botany, but they may, perhaps, become related to photography. They explain how it is that the vegetation on the highest summits of Mont Blanc is far richer than that of Spitzberg, where, in spite of a perpetual sun which lasts all the summer, the solar rays, passing through a much denser layer of atmosphere, cannot elevate the temperature of the ground to the degree that is observed at Mont Blanc, where these rays pass through more rarefied air. Here, indeed, we see in icy caverns, flowering *soldanella* and *dandelions*, with a variety of other plants which can only have received the heat necessary to vegetation from the ground in which they grow.

PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

BETWEEN Vilvorde and Brussels there is nothing to be seen worth mention; although, if one wishes to pass away the time, and, at the same time, see a good deal of the country, it is not a bad plan to take a conveyance from the former

* Some curious remarks by Dr. Phipson, upon the crystalline form of native sulphur from Sicily, have been published in *The Geologist* (vol. i., 1858). This author has shown that the natural crystals of Sicilian sulphur have been deposited from a solution containing sulphides, or hydrosulphuric acid.

place to the latter, instead of going by rail. There are a great many very pretty country houses, which are pleasing to the eye, if not sufficiently striking to make the subject of a photograph; and one has a good opportunity of seeing the country people, who are as interesting as such people usually are, so long as you don't comprehend them, which, in the case of the lower classes of Belgians, very few English photographers are likely to do. For my own part, I don't care about conversing with this class of the people in any country; generally speaking, they are entirely ignorant of everything in which a foreigner feels an interest, and I have seen enough of them to know that rural innocence, such as some who live wholly in towns consider identical with life in the country, is a dream of the imagination. As an instance of the different opinions men may entertain of similar subjects, I may refer to a recent statement made by a travelling photographer—I think, Sir J. Coghill who, speaking of the interruptions offered to the photographer, by a gaping crowd surrounding his instrument when pitched in the street of a town or village, says that a good-humoured joke will generally induce individuals who crowd round the instrument to get out of the way, and even to render assistance.

Now I will not say this sort of treatment of the many-headed may not succeed occasionally, but I have seen it fail in more than one instance; and, most certainly, it is a plan I have never adopted myself, nor one that I would recommend. The best course is, to pursue your operations without any regard to standers-by, and, if they come in your way, quietly ask them to get out of it. An Englishman has a way of making such a request, which is not likely to be resisted, infinitely more effective than any attempt to do so jocularly would be.

I found Brussels so very pleasant, that I remained there a considerable time, and took as many negatives as would of themselves have repaid a trip to the continent. The buildings in this city which are worthy of being reproduced by photography are numerous. Among those taken by me I find the following to be the most remarkable:—First and foremost, as is generally the case in the chief towns of the Netherlands, comes the Hôtel de Ville. This is a splendid building; it stands in the Grande Place, and, to be properly depicted, should be taken on a very large plate. The spire is of open gothic work, and, to the best of my recollection, above 350 feet in height. Another good picture may be made of two sides of the market-place opposite, including the house, once the Hôtel de Ville, where Count Egmont and Count Horn passed the night previous to their execution.

The Church of St. Gudule offers several interesting objects for stereoscopic pictures; and is sufficiently light to render photographic operations easy on a summer's day. Among the most interesting objects is the beautifully carved pulpit, which represents the expulsion of Adam and Eve from Paradise. The pulpit is in the hollow of the globe, on one side of which stands the figure of an angel with the flaming sword, and, on the other, death holding a dart. The whole is supported on the tree of knowledge of good and evil and the tree of life. Besides this, the view of the high altar makes an extremely pretty picture, and an interesting one may also be made of one of the chapels, that said to contain the miraculous wafers, to which a legend attaches which runneth somewhat in this wise:—A certain Jew stole, or instigated the stealing of, some consecrated wafers from the altar, and himself and sundry others of his countrymen assembled on a Good Friday in their synagogue for the purpose of insulting them, and, eventually, they stuck their knives into them; upon which, blood gushed forth, and the perpetrators of the deed were struck senseless. A Jew who had been converted to Christianity declared that he was present and saw the whole affair; and the consequence was, that certain Jews whom he denounced were seized, and tortured horribly by having their flesh torn from their bones by red-hot pincers, after which they were burnt at the stake. It is stated, and though I never happened to see it I have no reason to doubt the truth of the statement, that there is a procession of the clergy once a year, in commemoration of this extraordinary phenomenon, when the identical wafers are exhibited. The photographer who may desire to obtain a picture of this chapel, can easily ascertain which it is by asking for the Chapel of the St. Sacrament des Miracles.

I find I have a good picture of a church called the Church of Notre Dame de la Chapelle; I forget the name of the street in which it is situated, but I know it is the one along which I was driven in going from Brussels to the plains of Waterloo, as it was on that occasion it attracted my notice. At the top of the same street, also, there is another object worth taking, and this is, the Porte de Hal, a large gateway built in the gothic style, which the ruffian Duke of Alva is said to have used as a prison. It is used now as a receptacle for old armour.

Apropos of the Field of Waterloo, though a photograph of it does not offer many attractions as a picture, few English photographers who visit Brussels, and who have a day to spare for the purpose, would fail to visit it, especially as the cost of a vehicle there and back, including a fee to the driver, which would secure his assistance in any way in which he could be rendered useful, would not exceed twenty francs. The church and church-yard would make a very interesting picture; it contains the dust of a considerable number of English officers who fell in the battle. In speaking of the remains of English officers, I must not omit to mention the curious fact, that a considerable income is derived by the proprietor of the house in which the Marquis of Anglesey's leg was cut off, by showing the boot in which the leg was encased. The leg itself he inclosed in a coffin and buried in his garden, the spot being marked by a weeping willow, and a monument bearing an inscription. There are several other interesting objects to the photographer, which would occupy him at least a day in taking, but which would well reward him for his pains, by furnishing him with a series of the most interesting negatives ever produced.

Brussels itself would yield a far larger number of good pictures than those I have mentioned; but I cannot enumerate them, as, at the time I visited that city, the whole place was so crowded, in consequence of the fêtes held to celebrate the twenty-fifth year of the reign of King Leopold, that it was almost impossible to fix the camera in the streets, from the multitudes that thronged them from early in the morning till late at night, though, as I have already observed, I got a very fair number. VIATOR.

Photographic Societies.

LONDON PHOTOGRAPHIC SOCIETY.—P. LE NEVE FOSTER, Esq., in the Chair.

AT the meeting of this Society, held on Tuesday last, the CHAIRMAN stated that the Secretary was absent in consequence of a serious domestic affliction; the minutes of the previous meeting could not, therefore, be read.

The CHAIRMAN then showed some prints which had been received from Mr. Horsley of Cheltenham, who declined to communicate the process by which they had been obtained. Instead of using carbon, like that ordinarily used for the purpose, Mr. Horsley had taken pigments of various colours, and the result was the pictures now before the Society. The Chairman thought that photographers ought not to stick to one process alone, but try any other which gave promise of yielding good results. Silver prints were, no doubt, very beautiful, but he thought that an undue preference was given to this to the exclusion of every new method of printing. He must again repeat his opinion that photographers would find it to their advantage to admit the possibility of other substances yielding equally good results with the nitrate of silver, and he hoped they would give a trial to the various carbon processes.

A MEMBER (*sotto voce*): "Everybody wants everybody else to try these new processes."

The CHAIRMAN inquired if any gentleman present would

favour the company with any remarks on the prints before them—but no gentleman accepted the invitation, whereupon

Mr. Malone rose for the purpose of introducing to the society a camera he had caused to be constructed for his own use. He had come down to the meeting in the expectation that a paper was to be read, but as he found that there was nothing of the kind, he should extend the remarks he intended to offer on the subject of his camera. The instrument was the result of much careful consideration; in designing it he had taken all the good points he could find in a large number of cameras he had inspected, and had combined them in the one which he had the honour of presenting to their notice. The body of his camera was similar in principle to the ordinary bellows-folding camera, and was made of leather, which, though not everlasting, would last four or five years, and would be easily mended if damaged. It rested on a solid board, to which the fore part of the camera was firmly attached by a couple of screws, and which was furnished with an endless screw for the purpose of focussing—the length of the board allowing a picture to be taken at a focal distance of twenty-five inches. By means of a sliding front the lens could be raised about three inches. The plate-holder was capable of carrying a plate 13 inches by 12, but the size he preferred was a plate 13 inches by 11, because a plate of this size was 143 square inches, one inch less than a square foot, and glass dealers were in the habit of raising the price if you wanted a plate containing more than 144 square inches. The frame in which the plate-holder slides was so constructed as to carry the focussing glass when not in use, and this he thought a great convenience, as he had seen a photographer, with a very complete apparatus in other respects, who was obliged to carry his focussing screen under his arm. There was one objection to the frame which had just occurred to him, and which it shared in common with all other frames. When the slide was raised, and laid back while the exposure was taking place, he thought it possible that a ray of light from the zenith might penetrate into the camera and fog the plate. This no doubt could be prevented by laying the focussing cloth over it, but he thought it might be better to give the groove in which it worked a slight inclination, instead of having it vertical as at present. (He illustrated his meaning by a diagram.) It was constructed with a back, which swung in one direction only. It might be objected that the apparatus would have been more portable if the board which served as its base had been hinged, but for his part he preferred it solid; it was more rigid, and allowed of the use of an endless screw, which was a very decided advantage in focussing, as the screen could be readily moved by its means, even the hundredth part of a revolution. To give greater rigidity to the camera, which, however, he did not consider necessary, he had a brass rod, which passed through a hole in the head of the camera, and screwed into its back part, the hole through which it passed being furnished with a screw, for the purpose of rendering it immovable as soon as the focussing had been accomplished. The use of this rod was optional, and it was made to slide in a groove at the bottom of the board, so that it was not at all in the way when not wanted. The wood of which the camera was made was Moulmein teak, which was lighter and stronger than mahogany, and better calculated to resist changes of temperature. He had not been requested to mention the maker's name, but he thought he might venture to do so. It was a very handsome, well-made article, combining lightness with solidity, and he thought it did great credit to the maker, Ottewill. (Some little amusement was excited during the delivery of this description, by the evident admiration of the speaker for the joint offspring of his own and Mr. Ottewill's brain, which was certainly justified, as far as the external appearance was concerned, it being a very handsome apparatus).

A Member rose and asked the cost of the camera, that being, he thought, the most essential point.

Mr. Malone replied: "Twelve pounds."

The Member: "There is nothing at all novel in that camera. I bought one precisely like it in Paris of M. Jamin only a few days ago at half the price."

Mr. Heath regretted that he had not been aware beforehand that it was Mr. Malone's intention to bring such a camera, because in that case he would have shown one far better in every respect. To begin with the board, that would have been just twice as portable if it had been hinged so as to fold up with the camera; and as to its being rendered less rigid by being hinged, that was all nonsense; it could have been hinged in such a way as to be quite as rigid, nay, *even more so* (!) than it was now as a solid. As to the swing back, if it were an advantage that it should swing in one direction, it was equally an advantage that it should swing in the other. If it were desirable that the front of the camera should be so constructed that the lens might be raised, it was equally desirable that power should be given to lower the lens to the same extent, and still more desirable that it should be capable of being moved laterally. If the rod were necessary to give rigidity to one side of the camera, it was quite as much wanted on the other. In short, the instrument was about the worst he had ever seen; all the good points of a camera it possessed only by halves, and the bad points it possessed in their entirety. It was very evident that Mr. Malone was as proud of his camera as a father of his youngest-born child; but he had invited criticism by saying that he "was armed at all points," and now—he had got it.

Mr. Davis came forward to make some observations. He thought the camera before the Society possessed no particular recommendation, and was certainly deficient in some respects in the qualities of a good camera. He thought there was no reason whatever for supposing that a ray of light could get to the plate through the opening left in the top of the camera when the slide was folded back, because the sun never shone from the zenith in this country.

Mr. Shadbolt had nothing to say in praise of the camera; on the contrary, he thought it full of faults from beginning to end. He might be supposed to have some knowledge of wood, and he was surprised to hear anybody say that teak was lighter than mahogany, the very reverse being the truth. As to the relative durability of the two woods, he could only say that every carriage which rolled along the streets of London had the panels made of mahogany, and these were submitted to every kind of temperature, and, in the case of the doors, to a great amount of rough usage, and the exclusive use of this wood for such purposes was the strongest proof that no other kind of wood answered so well, or was so well capable of resisting change of any kind. He was of opinion that the back ought to swing in both directions, but if it were necessary that it should swing in one direction only, it ought to have been in the opposite direction to that in which it actually did swing; with respect to the front part, the operator ought to have the power of lowering as well as of raising the lens, and it was still more requisite that he should be able to move it in a lateral direction. There was no novelty whatever in the camera which had been brought there for their consideration.

Mr. Malone: "I did not say that there was."

Mr. Shadbolt had not said so either. He went on to point out how essential it was in many cases that a camera should have a swing back, or have a contrivance for obtaining the same result, and drew a diagram on the board, showing the manner in which any camera might be constructed to give the effect of a swing back at a trifling expense.

(The design was a very good one, but we cannot give an intelligible description in words.)

Mr. Ennell (who, though a foreigner, spoke remarkably good English) said that he thought the camera a very good one. Considering its size (13 × 13, with a depth when closed of about 5 inches) it was very compact; and it had also some improvements which gave it a decided advantage over many of the so-called portable cameras in use at present, and notably in the frame which carried the ground glass, which in general was very likely to get broken. He had himself adopted a contrivance to obviate the necessity of removing the focussing screen while taking a picture; which consisted in fitting two knobs to each inner side of the camera, and two corresponding knobs to each side of the frame which held the focussing glass, and uniting them by means of india rubber fastenings. When the operation of focussing was completed, the frame containing the plate was thrust down into its place between the camera and the focussing-screen, the india rubber fastenings yielding so as to allow the frame to take the position which had been previously held by the screen, which again resumed its place on the plate being withdrawn. This plan obviated the risk of smashing the glass, which was always incurred when you laid it about on the grass while operating. As to Mr. Malone's idea that light might get to the plate through the crevice left in the top of the camera when the slide was folded back, this was so, un-

questionably; there was no doubt about it; and it was from this circumstance that the fogging of the plate frequently arose. The French had obviated this by adopting folding-doors in lieu of the slide. He wished to say a few words with respect to himself. He had offered to the secretary to read a paper on photographic contrivances at any time when there was not more important business before the society, but as he had never heard anything further about the matter, no doubt the secretary, from the multitude of things he had to think about, had forgotten it.

Mr. Malone rose to reply to the objections that had been raised to his camera; but first of all he must observe in reply to a gentleman (Mr. Heath) who had complained that he had occupied the meeting with a speech three quarters of an hour long about a camera in which there was no novelty, that but for this there was every probability that there would have been no discussion at all; there was no business before the meeting and no paper to be read, so he rather thought he was entitled to their thanks for having occupied the time. As regarded the novelty of his invention, he had not claimed for it any other novelty than that of possessing more points than any that had been hitherto brought forward. He opposed the idea suggested by Mr. Davis that because the sun never shone from the zenith in this country, therefore no ray could enter the camera through the slide-opening. Suppose a white cloud were overhead, that cloud would reflect light in every direction. (Mr. Davis explained.) As to the statement made by a gentleman that a camera equal in every respect (The member: "Better!")—that such a camera as that before him could be made at half the price in Paris, why—*tant mieux pour les photographes Parisiens;* he was extremely glad to hear it. (It was very evident that he didn't believe it.) He did not ask anybody to have a camera made like his; it struck him that it was a decided success, and with the view of showing it he had desired the maker to send it down to the society's rooms; and he was very glad that he had done so, as it had enabled him to fill up a very awkward gap.

Mr. Shadbolt rose to ask the chairman if he thought it possible to restrain individuals from patenting processes which had long been known and practised by others, who had not thought it necessary or desirable to patent that which almost everybody knew. A case of this kind had occurred a week or two back, and such cases were not at all uncommon. He thought the president of the Society might be able to give an opinion on that point.

The Chairman was sorry that he was not himself able to give an opinion on the subject. He had thought very much about the matter, and was fully aware of the desirability of doing something to check such proceedings if that were possible, but he did not clearly see his way to prevent such occurrences at present.

Mr. Hughes wished to offer a few remarks on the subject under discussion. He thought the members present were indebted to Mr. Malone for the manner in which he had come forward that evening and saved them from having made a fruitless journey to the rooms. He concluded with some very sensible observations on the advisability of the council adopting some means of informing members beforehand of the subject that would be discussed at the ensuing meeting, so that they might come prepared to take part in the discussion, as doubtless many persons frequently came from a considerable distance to attend these meetings.

Mr. Malone also thought it would improve the character of the Society's proceedings if a request were made by the council to certain persons to read a paper occasionally. It was a little act of courtesy which many persons thought a great deal of, and he knew that some had been deterred from doing anything in this way solely from the feeling that if a paper were worth hearing, it was worth asking for. For his own part, he was not affected by any such scruples, and was always ready to speak without waiting to be asked.

The business, or rather discussion, having been brought to a termination,

The Chairman rose, and after remarking that this was the last meeting previous to the vacation, and warmly expressing his hope that they may all meet again after the vacation in increased health and strength, and with plenty of good negatives, pronounced the meeting adjourned until November the first.

The French Photographic Society.

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

A careful examination and comparison of the different systems under consideration, led to the deliberations being pushed beyond the narrow limits at first intended.

The common and primary source, the unique germ of all the processes, from which we have selected those which appeared to us worthy of reward, that is to say, of all the carbon processes, is incontestably that of M. Poitevin, and, consequently, the common father of all these inventors is M. Poitevin.

A few words will suffice to convince you of this.

In the month of August, 1855, M. Poitevin deposited at the office of the Prefect of the Seine the description of a process of photographic printing. The 15th February, of the following year, having modified it on certain points, he brought it to you.

What, now, was this method, reduced to its most simple expression? In August, 1855, application on the paper of a mixture of bichromate of potash, organic substances, and colouring matter, at one operation, before insolation. In February, 1856, application of the same substances, but in two operations, to wit—the bichromate and the organic body before, and the colouring matter or carbon after insolation. In both cases washing in distilled water, to complete and fix the proof.

Now if we follow the chronological order of the presentation, what shall we see?

M. Testud de Beauregard, in December, 1857, communicated to you a process of which the following is the *résumé*.

The use of bichromate of potash, of an organic substance and colouring matter (carbon). Only here the complete preparation, which always precedes insolation, is separated into two parts; first, immersion of the paper in the mixture of bichromate and organic matter; drying, then the spreading of the carbon. After insolation, the washing in common water. The manipulation alone varies, the principle is identical.

In January, 1858, a Mr. Sutton published a method of obtaining durable positives. This again was exactly the Poitevin method, for it contained nothing more than this:—

"Application on the paper of a mixture of bichromate of potash, organic substance, and pulverised charcoal; drying, insolation, and washing." On his own part, Mr. Sutton added an alkaline solution for clearing the image, if necessary.

The 10th April, 1858, Mr. Pouncy took out a patent in England, which was not published in that country until November, and in our *Bulletin* until the following month. If we isolate the constituent elements, we find, in substance, application on the paper of a mixture of bichromate of potash, gum arabic, and vegetable charcoal, in a single operation, before insolation. Afterwards washing in distilled water.

Finally, and to conclude this long review, on the 30th June, 1858, Messrs. Garnier and Salmon deposited in the hands of your Secretary a paper containing a process which, more or less modified by them in the interval, led to our being made witnesses of experiments in which the use of alkaline bichromate, of an organic body and of carbon, reproduced, with more or less trifling variations, a series of causes and effects which have their type in M. Poitevin's process, so that we might almost say, in truth, that if M. Poitevin had not existed, each of these gentlemen would have invented it.

Is it probable, we ask you, in presence of this severe but impartial analysis, to deny that these products, of different origins, ought all to bear, in some sort, a common trade-mark; and if we give prominence to some in our photographic world, by stamping them with a seal of honour, means should be found of associating very prominently, and even in the foremost place, the name of the initiator.

Such, in fact, was the object we proposed to ourselves, sensible as we were that our consciences could not be at rest, if, in the division of the rewards, M. Poitevin was forgotten, he being the sower, while others carried off the harvest.

It is true that M. Poitevin did not present himself at the actual competition, and that he has doubtless reserved all the weight of his merits to throw into the scales we shall have to hold next year. But if on the one hand this reserve caused us an embarrassment from which it was difficult

* Continued from vol. ii. p. 158.

to escape, on the other it perhaps made us more thoughtful of his interests; for it would have been a sad thing if his labours and services should remain thus suspended and finally cut off from honourable mention between the forgetfulness of a first competition and the contrary chances of a second.

The Duke de Luynes, who was kept minutely informed of all our proceedings, became aware of our embarrassment, and, to relieve us from it, he brought increased encouragement to our art, which still further entitles him to our gratitude. Thus, he has kindly prolonged the period for competing for the second prize of 2,000 francs until the 1st July, 1861. The same programme is maintained. As to the sum of 2,000 francs he offered us for 1858, he left it to us, with full permission to distribute it in such proportions as we pleased, for the encouragement and reward of labours made anterior to the 1st July, 1858. From that time we felt ourselves more free to act than when we were confined within our former somewhat narrow limits, and the proclamation of M. Poitevin's name at the head of the list of those to be rewarded for the discovery of new processes became a settled thing.

You will call to mind, gentlemen, that in the part of the programme relative to the prize of 2,000 francs, it was foreseen that this prize might be merited by three very distinct orders of works, that is to say, either by notable progress in the printing of proofs and in the guarantees for their preservation; by the discovery of new processes; or by a complete study of the chemical and physical actions which intervene in the processes employed, or which influence the alteration of the proofs.

If as yet we have only disposed of a part of the prize, it is not only because in the category of discovery we have not met with any progress sufficiently considerable or practical results sufficiently complete; it is also, because it appeared to us impossible to withhold a testimony of high approbation to the remarkable labours of MM. Davanne and Girard. These gentlemen had a prejudice to contend against of a peculiar kind. We entertained so high an opinion of the merits and importance of the labours of these gentlemen that we feared being carried away by our appreciation of them, and so awarding a larger portion of the prize than we ought. A prejudice of this kind rendered it infinitely more difficult for us to do them strict justice, because we feared being biassed by our friendship.

MM. Davanne and Girard's labours have extended over a period of nearly four years. In fact it was at the commencement of 1855 that they demonstrated after M. Legray, but by a more rigorous analysis, the minimum quantity of silver (5 per cent. maximum), that remained in the proof itself, and, consequently, the considerable losses resulting from the dispersion, in the residues, of the 95 per cent. not utilised. It is but just to mention, however, that in the method of utilising these residues, MM. Davanne and Girard have only simplified, without modifying in any important degree, the ways and means long since known to chemists, and subsequently to all photographers by means of MM. Barreswil and Davanne's book as well as by that of M. Legray.

About this epoch, great alteration in positives formerly distinguished for their vigour and brilliancy, excited serious alarm. To find the means of guarding against these dangers by ascertaining their cause, Messrs. Davanne and Girard subjected old faded proofs to a chemical analysis, as well as recent ones which had been purposely acted upon in a similar manner. In the different papers published by them in 1855, they showed:

"That all the faded proofs were sulphurised.

"That a good and vigorous proof was immediately altered by artificial sulphurisation.

"That, consequently, it is in the sulphur and the sulphides that the altering principle constantly resides, and hence that all the acids added to the hyposulphite being agents of sulphuration, and all old hyposulphites being sulphurated, the entire absence of both was necessary; and also that salts of gold alone should be used as the colouring agents."

In the same series of examinations they also clearly showed that all the changes were due to the combined action of sulphur and humidity. A proof was placed in a closed vessel containing dry hydrosulphuric acid, and resisted its action; but the instant that moist air was admitted, it began to show signs of alteration.

The publication of these researches was of real service to our art; for if some photographers had already given up the use of the above-mentioned process, it is quite certain that the majority continued in the old way; at present, however, this order of things is completely reversed, since, thanks to the gentlemen named, no teacher can hereafter recommend his pupils to follow the old method.

(To be continued.)

Miscellaneous.

How the Distance of the Sun is ascertained by the Yard Measure.—Professor Airey, in his Six Lectures on Astronomy, gives a masterly analysis of a problem of considerable intricacy, viz. the determination of the parallax of the sun, and consequently of his distance, by observations of the transit of Venus, the connecting link between measures upon the earth's surface and the dimensions of our system. The further steps of investigating the parallax, and consequently the distance of the fixed stars (where that is practicable), is also elucidated; and the author, with evident satisfaction, thus sums up the several steps. By means of a yard measure a base line in a survey was measured; from this, by the triangulations and computations of a survey, an arc of meridian on the earth was measured; from this, with proper observations with the zenith sector, the surveys being also repeated on different parts of the earth, the earth's form and dimensions were ascertained; from these, and a previous independent knowledge of the proportions of the distances of the earth and other planets from the sun, with observations of the transit of Venus, the sun's distance is determined, and from this, with observations leading to the parallax of the stars, the distance of the stars is determined. And *every step in the process can be distinctly referred to its basis, that is, the yard measure.—Curiosities of Science.*

Seizure of Stereoscopic "Questionable Subjects."—Under the head "Abuse of the Fine Arts" in a weekly contemporary (the *Era*), we were exceedingly glad to read of several seizures which the police have very recently made of those vile compositions which, we are sorry to see, still disgrace many of the print-sellers' shops of the metropolis. We believe, from the indications we see, that instead of retrogressing, this bad taste in art matters is progressing. In these days of Academies and Exhibitions, there ought surely to be a purer and higher standard than these filthy pictures. We hope that the police will continue to use that vigilance which they have shown in the present instance, so that if shame does not compel tradesmen to desist from the publication of these slides, that, at least, the dread of the policeman's visit will induce the suppression of that of which higher motives should have prevented the production. If this be the case, then we may hope that the trade in this class of subject will be driven to that secret system which is now applied to the Holywell Street class of literature.

The wearisome process between Duboscq Ferrier and others has been at last brought to a conclusion, the Court of Appeal having annulled the patent with respect to the manufacture of stereoscopes which had been granted to the former.

Photographic Notes and Queries.

ON THE EMPLOYMENT OF WATER-GLASS IN PHOTOGRAPHY.

Sir,—Perceiving in the "News," of the 3rd inst., a letter of suggestion relative to the employment of silicate of soda in photography, it may perhaps, at the present moment, be worth while to record the results and some of the difficulties encountered in attempting to utilise, for photographic purposes, this otherwise valuable agent, "water-glass."

A solution of silicate of soda, containing from 40 to 45 per cent. of dry silicate, is readily procurable in commerce, in the form of a viscid, syrupy fluid. This, when diluted with about an equal measure of water, affords a solution possessing the general characters of a varnish. Applied with a brush upon any polished surface it soon dries to a transparent even film, which offers a certain amount of protection to the material beneath—bright iron coated in this way is for a time, though not perfectly, preserved from rust. Such a covering will not, however, remain unaffected on exposure to

atmospheric influences. An efflorescence, due probably to the formation of carbonate of soda, is prone to appear on the surface, which, by increasing, ultimately destroys the continuity of the film. As a photographic varnish, to protect collodion pictures, its employment must therefore be deferred until some method of meeting this difficulty, or indeed of preventing the decomposition of the alkaline silicate by the carbonic acid and moisture of the air, shall have been suggested.

Some years since, in company with my friend Hr. Hambly, of Sheffield, I made experiments on the treatment of the paper employed in the printing process with soluble silica. Our plan of proceeding was to impregnate the paper, by one wash, with both silica and the chloride of sodium necessary to form the sensitive coating. We used for this purpose a solution of silicate of soda, to which hydrochloric acid was added in equivalent proportion. The proofs furnished by this process were not, however, in any appreciable degree, superior to those printed upon plain salted paper. The silicate employed alone led to no results, on account of the tardiness with which the silver compound is blackened on exposure to light.

The attention which this material is likely to receive, on account of its proposed use as a varnish, is my reason for offering these observations, unfavourable though they be, relative to the points of difference between this body and the resinous varnishes ordinarily employed.

Woolwich, June 6th, 1859. JOHN SPILLER.

BURNT-IN PHOTOGRAPHY ON PORCELAIN.

SIR,—A working man, who sometimes finds a little spare time, prefers applying himself to the beautiful art of photography to spending his time in a public-house. Like many of his class, he feels himself much assisted by the reading of the "PHOTOGRAPHIC NEWS;" for, through it, he has obtained information which has enabled him to proceed in the art with an ease and satisfaction he could not have gained without; and it has, without doubt, prevented him from spending his time in a worse manner, for which he tenders his sincere thanks.

Seeing the kind manner in which the editor answers tyros in the art, has induced him to ask the following favour:—

What method is adopted to produce photographs (views or portraits) on porcelain, and burning in the same so as to combine with the glaze in the burning, like ordinary painting on china? A WORKING MAN.

[We do not think much progress has hitherto been made in the above branch of photography. We shall be pleased to receive from those of our readers who may have been working on the subject, some account of their experiments, and we feel sure that they will gladly give all the information in their power to such a request as "A Working Man" has made.—ED.]

THE OXYMEL PROCESS.

SIR,—I have for some months been practising the oxymel preservative process, nor would I abandon it for any dry process I know of, were it not for one defect; and that is, that the skies of the negatives are always completely spangled over with pin-holes. I at first imagined they arose from a too liberal a use of nitrate of silver, knowing that in the wet process I have met with them sometimes, if continuing the development too long and with too much nitrate; I, however, tried less, but with no better result.

The collodion is *not* freshly iodised; on the contrary, it is many months old. I have tried several varieties, but the pin-holes are the same in all. And as they are to be seen as soon as the development commences, I am inclined to think that the fault is due to the granular structure of the oxymel.

Now, the honey I use is the best I can procure, though certainly it is not "dripping from the comb," as is specified for oxymel generally. But if I am always to wait until I can get honey from the comb, I may wait long enough, for it is impossible to get it at all seasons of the year.

Will you, therefore, Mr. Editor, or Mr. Llewellyn, or some one of your readers who have practised this most certain and beautiful process, kindly tell me how to remedy this defect? PHILOXYMEL.

CARDBOARD DISHES.

SIR,—Wishing to make myself a few cheap gutta percha dishes, I take the liberty of submitting to you my idea. I take some thin cardboard, cut as many sides as necessary to form a dish, dip each of them into a solution of gutta percha and benzole, and, when dry, cement them together so as to form a tray.

Now, that which I desire to know is this:—What should be the proportion of benzole to the gutta percha; how to proceed to coat evenly the solution on the cardboard without forming little holes which would absorb the liquid put into the dish; and, finally, how to cement the different parts of the tray together?

Perhaps some of your readers will be able to give me this information. B. A. I.

PORTABLE DARK TENT.

SIR,—I send a description of a dark tent, which is contained in a box A, 2 feet 6 inches long, and 1 foot 3 inches wide, and 3 inches deep, of which, when open, the lid B forms a back, C being a light frame hinged on to B, which falls back when shut, as shown by the dotted lines (fig. 2).

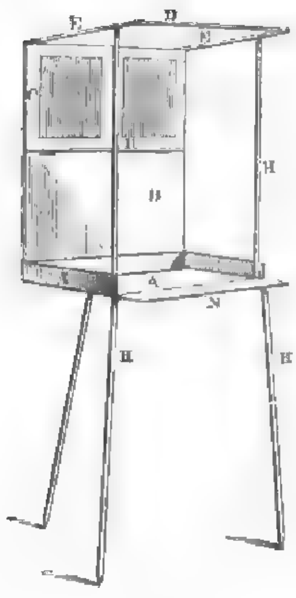


Fig. 1.

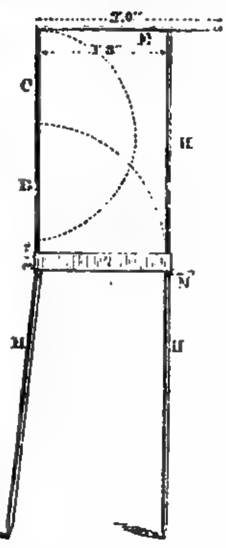


Fig. 2.

H H are two uprights in three pieces each, and socketed together like fishing-rods, and slip through sockets fixed to the sides of the box inside, to form front legs to the table and to support the two laths E E, which turn in pins at the top of the frame C, and catch on the top of the uprights H H by pins (fig. 3). The front side N drops down to increase the size of the table. C is a loose lath catching on the ends of the laths E E to support the front of the curtain. The whole is covered with one thickness of yellow and one of black calico, nailed on to the edges and back of the box, and hanging down loose in front to form a place to stand in, as in fig. 4.

Fig. 3.

By undoing the tops of the legs in front, the backs may be doubled and the covering folded up, and all, including the legs (of which the back one S fits in a socket at the back of the case, and is also jointed), may be easily packed

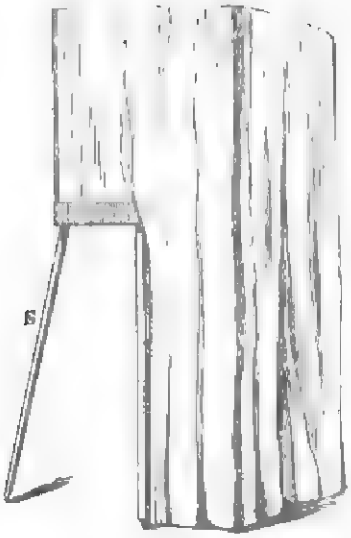


Fig. 4.

in a case and conveyed to the place chosen by the artist to photograph his view. I trust it may meet his approval, and may act properly for positives, and may never be adopted for taking wet negatives so long as there are dry processes which equal wet in point of beauty, and excel them in point of trouble, as requiring half as much apparatus.

C. T. H.

ANSWERS TO MINOR QUERIES.

TEST FOR THE PURITY OF CHLORIDE OF GOLD.—*Chemicus.* Your sample of chloride of gold is evidently much adulterated, and from your description we suspect the impurity to be chloride of sodium. Chloride of gold being a very expensive salt is one of those which is most frequently adulterated. Test it in the following way:—Weigh out with great accuracy a few grains of the dry salt, place it in a porcelain capsule and heat it, gradually raising the temperature to dull redness. Metallic gold will be left behind, and this being weighed should amount to 64 per cent. of the whole quantity of chloride taken. Chloride of sodium, however, being fixed at the above temperature will remain behind, and the residue must, therefore, be moistened with water and gently heated. The solution should not leave any residue when evaporated to dryness on a piece of platinum foil, and should not precipitate nitrate of silver. If a residue be left or a precipitate be found, it shows the presence of an impurity.

ALKALINITY OF THE NITRATE BATH.—*A Tyro.* The alkaline condition of the nitrate bath is not due to the presence of free soda or ammonia in it, but *oxide of silver*, which is soluble to a slight extent in pure water, and much more so in solutions containing ammoniacal salts. As the collodion which you use contains iodide of ammonium, each time a plate is dipped into the bath a certain quantity of nitrate of ammonia is formed by double decomposition with the nitrate of silver, and thus in time the bath becomes charged with this salt. The oxide of silver has been gradually produced by the action of the small quantity of free ammonia which you have added to the collodion to give it "keeping properties." As a remedy, add 10 drops of strong nitric acid to half an ounce of water, and acid this by a few drops at a time to the bath; carefully testing it between each addition with delicate test paper, and stopping when an acid reaction just begins to be apparent.

TO CORRESPONDENTS.

*** *We are happy to inform our readers that a series of articles will be commenced in an early number on a subject of the greatest interest and importance to all engaged in the practice of photography, or other branches of experimental science, be they old or young, amateur or professional.*

A JERSEY AMATEUR.—You may, with perfect safety, excite 4 dozen more plates in your bath without further replenishment. After then, you had better add about 5 grains of nitrate of silver to each ounce of the bath. A 40 grain bath should last for a long time with an occasional addition of nitrate of silver. We are glad to hear such good accounts of your success with the alabastrine process, which we gave at vol. i. p. 180.

J. S. O.—Some plans for cleaning old daguerreotypes have appeared in recent numbers; we recommend you to try these, as they will do no harm even if they are not successful.

W. W.—Received. We will see about the report mentioned.

J. B.—1. We do not think that the negative of your stereograms will fetch a high price in the market. The print is very good, and the subject pleasing, but similar pictures are now very numerous. You had better apply to some large dealer. 2. It should be four or five feet in focal length, and the reflector (good looking-glass) should be inclosed on all sides but these necessary for the passage of the light.

J. BENTALL.—The information you ask has been given so continually in our back numbers, that we must refer you to those for an answer. State a particular difficulty which you have met with, and we will do our best to help you; but we cannot search through our numbers in order to refer an inquirer to the best bath, the best developer, the best printing process, or the best toning process.

T. S. H.—We decidedly prefer the maker "No. 1," although higher in price than most of the others. If expense be disregarded, you should have separate lenses for each sized picture; but if you require only one lens, it should be a large sized one, as, by increasing the distance between the camera and sitter, you will be enabled to take with it a small picture, whilst with a small lens you cannot take a large picture.

W. STURGEON.—The Beaufoy's acetic acid recommended is of about one third the strength of glacial acetic acid; consequently, you must add ½ a drachm of glacial acid and 1 drachm of water in order to make your developing solution equal to the one containing 1½ drachm of Beaufoy's acid.

F. P.—We do not recommend you to attempt to make your own pyroxyline or collodion. It is too troublesome and difficult a job for a lady to undertake, unless it is an absolute necessity. It will be far better for you to purchase it ready made of some respectable maker; as an amateur cannot expect to prepare such a substance on the small scale, equal to that prepared in large quantities by experienced chemists.

F. L. G.—The fact of our having recommended its addition, should be a sufficient answer to your question.

T. A.—We have carefully read over our correspondent's letters, but we are compelled to say that the facts and experiments which he adduces in support of his theory do not really bear upon the subject. *A ray of light* might traverse space, but, unless received direct into the eye, we should have no evidence of its presence until it fell upon some body capable of arresting and reflecting it. Our correspondent is in error in assuming that as we ascend higher in the atmosphere the heat of the sun becomes less powerful. Professor Piazzi Smyth, in his interesting work, "Teneriffe," has shown that the contrary is the case. The fact of ice existing at the summits of high mountains does not prove that the suns rays have less heat, but that the radiation of heat is greater.

AN AMATEUR.—We fear that you will not succeed in removing the varnish from your negative sufficiently perfectly to allow of your intensifying it by redevelopment. Chloroform would be the best solvent to try, and the plate should be well rinsed in successive portions of fresh solvent.

W. S.—1. If all the vessels are properly cleaned out to start with, and the distillation proceed not too rapidly, the distilled water, prepared as recommended at vol. ii. p. 23, should be quite pure. 2. Sel d'or is a double hyposulphite of gold and soda. 3. We think you will obtain better tones and superior transparent pictures by printing them by the albumen process. 4. You must not use a *stop* for your lenses, as you thus lose the advantage of their rapidity.

CLARA W.—The most generally useful will be the Aplanatic.

W. L. C.—1. A drop of water is considered to weigh a grain; consequently, in formulæ, drops and grains are given indiscriminately. It would, however, be preferable if some uniform system of weights and measures could be adopted generally by photographers. 2. Place a few grains of iodine scattered about in a shallow dish, and lay the plate on it face downwards about an inch from the iodine. Keep the plate thus for three or four minutes. 3. The plates, when quite dry, may be preserved sensitive for several days. 4. Only a minute or so. Make a saturated solution of gallic acid. 5. The proportions are correctly given. You may, of course, make any quantity of the solution you like, if the same relative proportions are adhered to. 6. We think the albumen process will answer the purpose very well for stereoscopic transparencies. Perhaps your sulphuric acid was not strong enough; instead of diluting with water, add more acid, trying the result between each addition. 7. Yes; ½ a drachm to 10 ounces of water.

W. S.—Received.

A SUSSEX PHOTOGRAPHER.—We hope soon to receive further information on the subject. We think *parts* of acetic acid are meant.

W. A. D.—If the diaphragm is not placed at the proper distance from the lens, you will lose the good effect of the large size of the lens.

F. A. D.—You have too much water in the collodion; arising, most likely, from your having used washed ether.

J. T . . . . N.—No practical process has yet been discovered by which a positive by transmitted light can be taken by an operation in the camera.

A NOVICE.—According to Mr. Hardwich, the addition of glycyrrhizine to the collodion does not tend to deteriorate the bath with which the collodion is used.

A. M.—Your cyanide of potassium is very impure.

O. X. Y.—Received with thanks.

ERRATUM.—Vol. ii. p. 155. In the formula for the toning bath, *bichromate* of soda is put for *bicarbonate* of soda.

Communications declined, with thanks:—M. G.—Stereo.—An Old Card.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—F. I. P.—P. P. L.—Amateur.—B. Paper.—W. R. O. X.—Zeno.

IN TYPE:—Magnum Bonum.—C. T. H.—R. M. S.—Warrengal.—M. M. D.—W. L. Scott.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 41.—*June* 17, 1859.

THE "LUYNES" PRIZE.

In the present number is concluded the report of the committee appointed by the French Photographic Society to adjudicate on the claims of the respective competitors for the prize offered by the Duke de Luynes for the discovery of a good method of printing photographs in carbon. The great importance of the subject to which it refers, as well as the desire to mark our sense of the liberality of the Duke de Luynes, by giving it all possible publicity in this country, induced us to give it without abridgment, to the exclusion of other matter of, possibly, greater present interest; but as the length to which it extends may have prevented some of our readers from giving the necessary time for its perusal, we will embody the principal points of interest it contains, in the following article:—

The fact that photographs taken within the last few years had faded completely away, having come to the knowledge of the Duke de Luynes, he, with the view of preventing the art from falling into disrepute, placed a sum of £80 in the hands of the council of the French Photographic Society, with a request that they would award it as a prize to the discoverer of a method of printing photographs in carbon. This prize gave the required stimulus, and several French photographers commenced a series of experiments with the object of discovering the desired process. Chief among these were M. Testud de Beauregard, and MM. Salmon and Garnier; the former of whom, by the description he gave of his process, appears to us to have been the first to give the idea of the method now practised in this country and in America, and, it must be admitted, with greater success than he himself has been able to obtain. Strangely enough, though this gentleman has exhibited very promising pictures obtained by the means he described, his attempts to produce them in the presence of the committee were wholly unsuccessful. The next claimants for the prize, who were called before the committee, were MM. Garnier and Salmon, who have long worked together. These went through the whole of the manipulations in the presence of the judges. Over and above the difference in the ingredients used by them and Mr. Pouncey, there is this material difference in the manner in which the carbon is applied to the print; they spread the carbon on the paper *after* insolation, and to this circumstance we are disposed to attribute the imperfections in their process which the committee point out: want of half-tone, want of clearness in the whites, and a proper rendering of the distances. As Mr. Pouncey was not present, the committee, in a spirit of fairness and impartiality which does them great credit, determined to relax the rule that had been laid down for regulating their proceedings, and instead of insisting that he should come to Paris to operate before them as MM. Salmon and Garnier had done, they decided on testing his process by operating themselves in the manner described by him; and in order that no undue advantage should be given to the Frenchmen from the fact that they had produced their pictures themselves, the committee resolved to produce a print by each process, and decide on the respective merits of the two processes from the prints thus obtained; in this way the competitors were placed on precisely the same footing. The result of these comparative experiments was, that the judges came to the conclusion that, in an artistic point of view, the merits of the two processes were equal; that the manipulations in the Pouncey process were rather simpler, but the exposure required was four times greater than in the Salmon and Garnier process; in other respects, the advantages and the disadvantages of the two processes were balanced.

A great part of the report is occupied in discussing—discussing is hardly the word—in pointing out the merits of M. Poitevin. It was M. Poitevin who, in August, 1855, suggested the use of a mixture of bichromate of potash, organic matter, and a colouring substance, applied to the surface of the paper in one operation; and who, six months later, modified this process by dividing the single operation into two parts, applying the mixture of bichromate of potash and the organic substance before insolation, and the colouring matter afterwards. It certainly would be difficult to point out any real difference between these two methods of M. Poitevin and those previously described; and we think the committee are quite justified in assuming that they are nothing but modifications of the same process. At the same time it should be borne in mind that each of them may have derived his process from an experimentalist who employed bichromate of potash and organic matter in photography years before 1855; this gentleman, we need scarcely inform Englishmen, is Mr. H. Fox Talbot. We were somewhat surprised, on reading the report, to find that in reviewing the past of photography no mention was made of the services rendered to the art by this gentleman; not that we attribute this to any desire on the part of the committee to exalt the reputation of their own countryman by omitting all mention of Mr. Talbot's labours and discoveries, but from their being themselves unacquainted with them in reference to the subject under consideration.

It should be borne in mind that M. Poitevin was not a competitor for the prize; he himself had made no claim; hence it was that the committee constituted themselves his advocates. Had he come forward in opposition to MM. Salmon and Garnier, and Pouncey, it is difficult to see how the judges could have avoided giving him the entire prize, as there cannot be the shadow of a doubt that he published his discovery nearly three years before either of them. The motive suggested by the committee for his not coming forward is that he is desirous of bringing the whole force of his merits to bear on the competition to be decided next year; but they, taking his merits into present consideration, and fearing that some other person may make so decided a step in advance by next June as to carry off the whole of the prize, and so deprive him of all reward in return for his labours, resolved on awarding him a portion of the prize which the donor had given them permission to divide in any way they thought advisable.

The next claimants on their attention were MM. Davanne and Girard. The labours of these gentlemen are familiar to the readers of this journal, but they are not yet completed. As far as they have gone they have exhausted the subject; the careful minuteness of their experiments is evident to all who read their papers; we feel that their statements are reliable and their opinions are formed after mature consideration and examination of facts, and are not mere theoretical speculations; it is, therefore, with sincere pleasure that we see them placed in the foremost rank of those to whom prizes were awarded, and we should have been even better satisfied if they had been placed considerably in advance of the others. We conceive that there can be no comparison

between the value of their labours and those of either of the other competitors.

The advantages to be derived from the discovery of these methods of printing in carbon—if that can be called a discovery which in its chief feature has been known for years past—are problematical; hitherto the advantage has been decidedly in favour of silver-printing, and we certainly do not feel disposed ourselves to abandon it in favour of any of the carbon processes yet published, and such appears to be the opinion of nearly every photographer. Therefore the researches of MM. Davanne and Girard are of the highest importance in every point of view. It is not necessary that we should go into them in detail, as they will be found in the report, but we will enumerate one or two of the more important facts to be derived from their researches. In the first place, the inference that may be drawn from their experiments as regards the permanency of silver prints is, that provided they are taken with proper care and precautions, they are unalterable; and that foremost among the precautions to be taken is the use of salts of gold as toning agents. They also pointed out the effect of the nature of the size in the paper on the colour of the print, the necessity of the presence of free nitrate of silver in order to obtain a print of a rich tone, and the identity of effect produced by this substance, whether fused or crystalline, the apparent difference being caused by its acid or neutral condition, and not by the physical condition of the particles; the deteriorating effect on the silver bath of animal charcoal, unless this substance had been previously most carefully purified by being washed and calcined, not merely washed, as that does not remove the whole of the hydrochloric acid. Moreover, they gave great attention to the chemical changes in the substances employed in the production of prints, and the conclusion at which they have arrived is that the chloride of silver is reduced to a metallic condition by the action of the light, the liberated chlorine attacking the free nitrate, converting it into a chloride, which is in its turn reduced to a metallic state, the particles of silver being attracted to those previously formed, and the again liberated chlorine attacking a fresh quantity of nitrate, until the whole of this substance is reduced. Objections have been taken to this theory of the manner in which the proof is formed, but we attach no particular weight to them. We know that chlorine has a great affinity for silver, which it converts into a chloride, and we also know that the affinity of the chlorine may be overcome by the effect of solar radiation, and, as a natural consequence, the silver is isolated and resumes its original metallic condition. The very simplicity of this theory is a great argument for its correctness, as we almost invariably find in chemical experiments that modifications which at first sight appear very complicated become exceedingly simple when thoroughly understood. Hence we are disposed to accept MM. Davanne and Girard's theory without hesitation, the suggestions that have been put forward in opposition merely complicating that which is in itself a perfectly intelligible explanation.

It must be a source of great gratification to every photographer that the result of these systematic and severe tests to which silver prints have been subjected has been the establishment of the fact that these prints do not necessarily alter because they are silver prints, but because of some impurity in the chemicals employed, or want of sufficient care on the part of the manipulator. Indeed, this might have been assumed from the number of old silver prints known to exist in this country; but we could not feel sure that the assumption was correct with the knowledge that such a large proportion of prints have faded from sight and memory; as those who are very sanguine on the subject of carbon printing maintain that those which have resisted the effects of time are rare exceptions to a general rule.

We need not say that we duly appreciate the importance of obtaining a really good method of printing in carbon, because, in spite of the improvements that have been made of late years in photographic printing, we could not help feeling a greater degree of confidence in the permanency of a substance which we can see still existing on paper on which it was impressed hundreds of years ago, than in the use of a substance which, however strongly our reason may persuade us is equally permanent, has not stood a similar test. At the same time, we by no means advocate the abandonment of the silver process until it is proved that the carbon process is capable of producing a picture of equal beauty, which it most certainly has not done yet. It is for those who have, by anticipation as it were, reaped the reward of a discovery which they can scarcely be said to have made, to prove their title to the reward they have received by giving to the world a perfected process which shall succeed as invariably as that now in ordinary use, instead of one which appears to fail in the hands of nine-tenths of those who have tried it.

In conclusion, we feel it to be due to the Duke de Luynes to express our acknowledgments, and that of photographers generally, of the liberal manner in which he has come forward to advance the progress of photography; and though his desire to see a really good carbon process has not been gratified, yet sufficient has been done to show that it can be made available for the reproduction of a limited number of subjects, and he has supplied a stimulant which may lead to more valuable results in the future.

THE TRANSMISSION OF HEAT THROUGH GASES.

BY PROFESSOR TYNDAL, F.R.S.

On Friday evening, June 10th, Professor Tyndal gave a most interesting lecture on the above subject, at the Royal Institution. His Royal Highness the Prince Consort occupied the chair. The lecturer commenced by stating that the results which he intended to bring before the meeting that evening were quite new, and as the experimental illustrations were of a very refined and delicate character, he must ask the indulgence of the meeting in case of any of them failing; for not unfrequently experiments which had perfectly succeeded in the laboratory were unsuccessful at the lecture table. He commenced by referring to certain subtle phenomena of vibrating media: for instance, if a bow were drawn across a tuning fork it was well known that the resulting sound was occasioned by the vibration of the metal throwing the atmosphere into a corresponding state, the waves of which were transmitted to the ear, where, by means which might never be fully understood by us, they produced the sensation of sound. Now, it was the belief of men of deep thought that there existed a strict parallelism between the phenomena of sound and of light—that luminous bodies gave rise to similar vibrations which, being transmitted between the source of light and the eye, produced the effect of vision. The medium in the case of light was considered to be a certain ethereal fluid, pervading all bodies and extending into the stellar spaces. The sun was the great fountain of light for our system. The light from this body came to us in an infinity of beams, in waves of various length, and being passed through a prism these beams were each deflected from a straight line to a different direction, according to their wave-length, and thus gave rise to the solar spectrum. (The electric light was used to illustrate this as being the nearest approach to solar light yet known, the brilliant light caused by the current of a 40-cell Grove's battery passing between separated charcoal points was thrown through a prism, and thence on to a white screen, when the brilliant spectrum of the electric light burst into view.) The lecturer proceeded to state that each of the brilliant colours there seen was occasioned by a vibration of this ethereal medium of a certain length; the blue colour was the result of more rapid vibrations, and might be compared to a shrill sound or high note in music, whilst the red was occasioned by a slower vibration, similar to a deep, grave tone on an organ. And

as there existed atmospheric vibrations which would be either too shrill or too grave to be heard, so there existed vibrations of the luminiferous ether, which were either too short or too long to be seen by the eye. The former existing beyond the blue rays, and constituting the most refrangible part of the spectrum, were known to exist by their remarkable power of determining certain chemical decompositions, and were the rays principally active in the art of photography, whilst the latter or longer vibrations existed, as Sir J. Herschel had first shown, beyond the red rays, and gave rise to the sensation of heat. There existed also a test for these obscure heat rays in the thermo-electric pile of Melloni. (The lecturer here performed an experiment to illustrate this, by causing the obscure rays beyond the red end of the spectrum to fall upon a thermo-electric pile in connection with a delicate galvanometer, the deflection of the needle of which at once gave evidence of the existence of heat action.) This experiment proved also that there existed different kinds of heat analogous to the different varieties of colour, for these obscure heat rays were intercepted by several bodies, such as glass and water, which were perfectly opaque to them, whilst the luminous heat rays, the extreme red, would pass through these media. Rock salt was stated to be the only substance known which was perfectly transparent to all varieties of heat rays; and this was the reason why these obscure heat rays were invisible: the aqueous humours of the eye were perfectly opaque to them, and they could not, therefore, reach the optic nerve. This was experimentally demonstrated by interposing a glass cell filled with the crystalline humour of an ox's eye in the path of a ray of heat acting on a thermo-electric pile; the heat rays were shown to be entirely cut off. The lecturer stated that in the course of the lecture he would show that other bodies, perfectly transparent to light, exerted a similar absorptive action upon the rays of heat, and he had found that such as were rich in hydrogen were eminently opaque to these obscure heat rays.

Investigations on the transmission of heat through solids and liquids had already been made by Sir J. Herschel and by Melloni; but the only experiment yet made on the transmission of heat through gases was one by Pouillet, who made some observations on the power of the atmosphere to obstruct the heat rays of the sun, but, owing to the want of sufficient delicacy in his apparatus, with no very certain results. The lecturer then proceeded to state that he had undertaken to investigate this hitherto almost unknown domain of science, and by interrogating nature in other ways, and with more delicate appliances than had been done by Pouillet, he had already succeeded in obtaining some very extraordinary and unexpected results. An experiment was here made to show the absorption of heat by the atmosphere. A tube, about four feet long, closed at each end with a disc of rock salt, was connected with an air-pump; at one end was arranged a hot body, radiating obscure heat (an iron ball heated just to a point below redness), and at the other was placed a thermo-electric battery, in connection with a very delicate galvanometer. The current from a second thermo-electric battery was also conveyed to the galvanometer, and these two currents were caused to circulate round the needle, in opposite directions, through two independent coils of wire; and thus by equalising the intensity of the two currents, by varying the distance between the second thermo-electric pile and the source of heat, the needle of the galvanometer could be brought to the zero point, whilst the slightest preponderance of one current over the other would be immediately detected. This apparatus was arranged so that when the tube was filled with air the needle should stand at zero, when, by exhausting the air from it, the deflection of the needle immediately showed that more heat was then transmitted through the vacuum, and upon re-admitting the air into the tube again the needle returned to its former point. (This was an exceedingly delicate experiment; and in order to render the slight motion of the needle of the galvanometer sensible to the whole audience, it was strongly illuminated by the electric lamp, and a magnified image of the dial of the instrument was thrown upon a screen by means of a lens. In this way an almost imperceptible motion of the needle was rendered clearly visible.) By trying, in this very delicate manner, the effect of different gases upon obscure heat rays, the lecturer stated that he had discovered that *all* gases exerted an absorbent action upon these rays, and gases containing hydrogen in a prominent degree. This was illustrated by filling the tube with coal gas; in this case, the experiment tried in the manner described above, showed that this gas, although perfectly transparent to rays of light, was almost opaque to the dark heat rays.

Another experiment, similar to the above, was next tried; but with this difference, that the source of heat was not an iron ball radiating mere dark rays of heat, but a luminous body more nearly approaching the sun in character, viz., the Drummond, or oxyhydrogen lime light, which radiated *luminous* heat beams. Now Faraday had long since shown that the heat rays of the sun would pass through ice, and he had even fired gunpowder by concentrating the sun's rays on it by means of a lens of ice; and the experiment now tried showed that the luminous heat beams (the extreme red rays of the spectrum) passed freely through the same tube of coal gas, which had just been shown to be opaque to the dark heat rays.

The lecturer concluded by stating that some very important considerations arose from these experiments. It was seen that *obscure* rays of heat were intercepted and shivered to pieces by gases, but the *luminous heat* sent to us from the sun passed freely through these media. Thus the solar heat could pass uninterruptedly through the earth's atmosphere, but upon reaching the earth it was arrested, and became *obscure* heat. This kind of heat had just been shown to be incapable of transmission through the atmosphere, and therefore on radiation from the earth it was not sent back into space, but was at once stopped by the atmosphere, which was heated by it, and thus served to keep up the proper temperature of the globe. The atmosphere, acting in the same way as a ratchet wheel in mechanics, allowed the solar heat to come to the earth, and when there prevented it from radiating back again into space. It might, therefore, be imagined that the distant planet Neptune, if it had a tolerably dense atmosphere, would allow the solar rays to pass to the body of the planet, and when there prevent them from escaping, so that, in spite of its enormous distance from the sun, the temperature of Neptune might be such as to make it a tolerably comfortable place to live in.

A NEW METHOD OF DARKENING COLLODION NEGATIVES.*

BY DR. HENRY DRAPER.

PROTOCHLORIDE of palladium offers a very advantageous means of darkening collodion negatives.

The substance is easily made by dissolving thin portions of palladium in nitro-muriatic acid. The action goes on very promptly, forming a dark, reddish-brown solution. This is to be evaporated to dryness, taking care that the heat does not rise too high, so as to decompose the resulting chloride, but that it is continued long enough to remove the acid. The brownish residue, protochloride of palladium, is soluble in water, and in that state is fit for photographic use.

If we take a collodion picture in the moistened state which it presents when fixed with cyanide of potassium or hyposulphite of soda, and pour upon it a portion of this brown solution, a change very quickly takes place, the picture gradually darkening, and assuming degrees of blackness corresponding to its own shadows and lights, which therefore remain relatively unchanged. In those points where the

* Read at the last meeting of the American Photographic Society.

effect has gone on to a maximum, a velvety blackness is assumed altogether impervious to the light.

It is immaterial whether the picture has been a positive or a negative, the effect is the same, though less in the former than in the latter case. It is almost immaterial whether it now be viewed by transmitted or reflected light; in both cases its various shades present a black appearance.

In the application of the protochloride to such a picture, it may be observed that if the solution is strong the full effect is reached almost in a moment. Prolonged exposure is needless, and indeed gives rise to no further effect. The excess of the solution may be poured off from one corner of the plate, and so used over and over again till exhausted. As it becomes weak, the action goes on more slowly, and the operator should observe the precaution of examining the glass from the other side, to be certain, from its blackening, that the changes have prevaded the film through and through.

As I have said, the most advantageous time for employing the palladium is, perhaps, just after the picture has been fixed. It may, however, be used at almost any other stage. Indeed, pictures that have been made for a long time may, in like manner, be blackened after previously moistening them in water, though this operation is perhaps less satisfactory.

The operator will find no difficulty whatever in this application of the protochloride of palladium. There is no risk that it will leave unpleasant stains or marks on the plate. In its action it is not only certain but clean; indeed, he may perhaps be disposed to believe that in the transparent parts it exerts a good effect in cleaning off any trace of fogging that may hang about them. This, however, is probably only in appearance, through the other portions becoming so intensely black. The quantity of solution consumed is quite insignificant, as many drops only being wanted as are necessary to flow over the surface of the plate when it is inclined from side to side.

The following simple experiment will illustrate the advantages arising from the use of this substance:—Having prepared a collodion film in the usual way, I exposed it to the light of an Argand lamp, at a distance of four inches in the camera slide, uncovering it by half an inch at a time, at successive periods of 4, 2, and 1 minute, and 10 and 5 seconds. The stains in the collodion being developed in the usual way, I darkened one half of each of them by chloride of palladium, leaving the other half untouched. On printing from this plate, it was found that the stain blackened by the chloride, and which had been exposed for 5 seconds to the lamp, was as effectual as the unblackened one which had been exposed to the lamp for 80 seconds. It may therefore be inferred that the opacity of pictures is increased 16 times by the use of proto-chloride of palladium.

It moreover exerts a good effect by increasing the adhesion to the glass, so that a picture which has been treated in this manner, will bear much rougher usage than one which has not, and which remains unvarnished.

PHOTOGRAPHY AT THE SEAT OF WAR.

. . . . . Nadar has been sent for to head-quarters for a particular mission; and perhaps at the present moment photography, represented by him, floats in a balloon over the field of battle, for the purpose of depicting the manœuvres of the enemy. Thus the bold attempt made by him some months since in the hippodrome, which was ridiculed at the time by certain strong-minded parties, has been, possibly, applied to an indisputably useful purpose, which may result in its author reaping a reward at which we shall greatly rejoice. At the same time, other of Nièpce's disciples are taking photographs of greater or less interest, and, thanks to these, we can follow the triumphal progress of our troops. We cannot say whether or not the generals and superior officers who died so gloriously in the combats at Montebello, Palestra, or in the great battle of Magenta had their portraits taken previously; but we know that most of the subaltern officers figure largely in the collections of portraits which have been made. It is the fashion to have one's portrait taken in camp. The Turcos are especially and unexpectedly fond of submitting to the operation. One of them wished to be represented in the act of seizing an Austrian prisoner whom he had managed to get hold of in the *mêlée*, and was overjoyed when the photographer handed him the desired picture. A Zouave waited on Disdéri the evening previous to the fight at Palestra, and addressed him thus:—"Friend, perhaps to-morrow it may be my turn to mount guard in another world; but, previously, I should like to send my portrait to my birthplace." "Nothing can be more easy, my fine fellow," replied the artist; "we will operate directly, and the portrait will be ready for you when you call to-morrow." The next day our Zouave returned, and the portrait was handed to him. He looked at it for some time, but appeared by no means over pleased with it. "Sapristi!" he exclaimed, "that is not like me now." "What is wanting?" asked Disdéri. "Nothing is wanting; on the contrary, there is too much," replied the Zouave. "How too much?" "No doubt of it, you have represented me with two hands!" "Well, and are they not admirably brought out?" "Yes, indeed, but just look here, I have only one now." He had had his hand taken off at the wrist.

A photographer writes to us, under date the 8th June. . . . . At Frecate two peasants stopped my mule as he was taking a run across the fields, with the whole of my apparatus. You should have seen the fright expressed in their faces at the sight of my camera, which they evidently supposed to be a gun of novel construction. Indeed, you may see the expression of their faces, for I was so amused by their attitude, that I took a picture of them there and then.

I shall bring back in my portfolio photographs of all kinds, and which would be useful to a painter of battle scenes; some of them are dated from the cemetery at Montebello. That which I could not depict was the emotion I felt in this asylum of the dead, where corpses lay above and below the ground—where the soldiers came from amidst the horrors of the fight to breathe their last on the graves. A mournful spectacle I assure you, and one which was only softened by the reflection that the cause for which they died was a just one. I am convinced, too, that the blessings of the Italian people must have alleviated their last agonies.

You cannot conceive the extent to which our troops are electrified by the enthusiastic reception they have met with. . . . . . . We are often requested to make double portraits consisting of one Zouave and a Sardinian rifleman—a great intimacy subsisting between these two corps. I met a good many well-known Parisians yesterday at Novara. Among them were M. Audigen, the correspondent of the *Patrie*, who was in company of M. Durand Brager, whose pencil rendered such valuable services in the Crimea. As regards photographers, I have only met Disdéri; but I know that they are all along the line. You may believe me, photography will do its duty here bravely. . . . .
—*La Lumière*.

LEATHER VARNISH FOR POSITIVE PRINTS.

BY WENTWORTH L. SCOTT, ESQ.

In your notice of the report of the "Commission on the Prize founded by the Duc de Luynes," I see a preservative process, by M. Blanquart Evrard, of Lille, which consists in the alternate application of gelatine and tannic acid, in solution, to the positive print, with the view of precipitating *insoluble leather* between the interstices of the cellulose.

I beg to say that I have prepared prints by this process for the last two years and a half, and regret that I have only a small and solitary specimen with me here, which, however, I inclose for your personal inspection. I had purposed to make known the process when three years had elapsed from

the time of my first experiments. As it is, I will now give the *modus operandi* in full, for the benefit of your readers.

To one ounce of *Nelson's gelatine*, add a pint and half of cold distilled water, and allow them to digest for a few hours; then boil, in an enamelled saucepan, and clarify with white of egg in the usual way; strain through a cloth, and then filter through animal charcoal, in order that the liquid may be perfectly decolorised. I need scarcely mention, that this solution must be kept at from 90° to 120° Fahrenheit while in use, to prevent gelatinisation on the surface of the print.

A number of finished and *dry* photographs may now be immersed in the above for five or six minutes—air bubbles being carefully avoided as usual. At the end of that time they may be taken out, and pinned up to dry—if possible, in the sun, or before the fire. They should next be soaked, from ten to fifteen minutes, in a cold, aqueous solution of pure tannic acid, which should be dissolved in the proportion of 200 grains of the acid to each pint of water; this, before using, must also be decolorised. The prints must be impregnated with the two solutions several times alternately (carefully drying them after each immersion), according to the quality of the paper, and the surface it is thought desirable to obtain. *Commence* and *finish* with the *gelatine* solution; rinse carefully in tepid, soft water, and dry for the last time.

As the above solutions become coloured by use, they should be again passed through animal charcoal, and their strength recruited by the addition of fresh material: it will be found useful to note the specific gravity occasionally. When a *very high gloss* is required, both solutions (proportionately) may be made more concentrated; but care must be taken, or the deposit will, perhaps, be uneven or opaque. If a *greyish-white film* appears on the immersed print (from its not having been quite dried after previous immersions), at once remove it with a flat camel or badger-hair brush.

Photographs are much improved in appearance by this process, and their durability is indubitable. *Salted* paper prints are made to appear like *albumenised* ones of a very fine quality, thus bringing out more fully the details of the picture.

The small print inclosed was treated in the way just indicated more than twenty-seven months ago, as you will see by the date at the back. It was purposely *over-toned* in an *old* and *acid* hypo. bath, and was washed only for two hours; but the *sulphurisation* at *first* visible has not been augmented in the slightest degree since. As the solutions were not decolorised, the back of the print is slightly tinted.

The value of this process, for arresting the decay of unique or rare prints, will, I am sure, be readily acknowledged by the readers of the "PHOTOGRAPHIC NEWS."

Misson, near Bawtry.

MR. SKAIFE'S LECTURE ON INSTANTANEOUS PHOTOGRAPHY.

A "MORNING lecture" on this subject has been recently delivered by Mr. Skaife in the gallery attached to Mr. Hogarth's print establishment in the Haymarket. Owing, we presume, to the unusual hour, and the high charge for admission, the lecture was not very largely attended. It is scarcely a desirable mode of procedure to deliver morning lectures on a subject so interesting as photography, unless, indeed, the lecturer is anxious to illustrate his subject by actual demonstration. There are various reasons to be urged against the practice, chiefly that prudent photographers can ill afford to lose some of the most precious hours of the day to attend lectures. Mr. Skaife's name is already associated with some very clever feats in this branch of the art; among which are the pictures which he has taken of an exploding shell. The object of the lecture was to demonstrate the great utility of instantaneous photography to travellers desirous of keeping pictorial remembrances of the places visited, and that while it facilitated the operation of taking views, it also offered great advantages in regard to portability—an object of great moment to the traveller. In the room there were many views which Mr. Skaife had taken first on small plates, and which he afterwards had magnified; so that a great number of small views might easily be taken and put into a small compass, which could be magnified at leisure. The lecture was interspersed with Mr. Skaife's personal experiences in obtaining views of steamers sailing, the election scenes at Greenwich, and the manner in which he had caught the cannon ball in its flight. He exhibited the pistol camera, by which he had obtained the results which he exhibited. During the delivery of his lecture Mr. Skaife illustrated the mode of taking these instantaneous views, and urged the importance of such an aid to military men, in obtaining views of fortifications, &c.

Dictionary of Photography.

CYANIDE OF SILVER is obtained in the form of a white curdy precipitate by mixing a solution of nitrate of silver with an alkaline cyanide. It turns brown when exposed to the light, and is very readily decomposed by heat. Cyanide of silver dissolves readily in solution of cyanide of potassium, forming argento-cyanide of potassium; the same salt is also formed whenever iodide or chloride of silver are dissolved in cyanide of potassium. It is of some interest, inasmuch as it is always formed in the cyanide fixing solution used in photography (whence it may be obtained in crystals by evaporation), and is largely used in electro-plating—a current of electricity being passed through the solution, any metallic article fastened to the negative pole is soon coated with metallic silver.

CYANIDE OF IODINE.—A compound of equal equivalents of cyanogen and iodine, which seems to possess the property of giving great rapidity to photographic preparations. It is prepared by mixing in a mortar two parts of dry cyanide of mercury with one part of iodine, and gently heating the mixture in a retort; the iodide of cyanogen sublimes in beautiful white silky needles. Great care must be observed in manipulating with this body, as it is very poisonous. When a solution of iodine is decolorised by means of cyanide of potassium, a liquid is obtained containing both cyanide of iodine and iodide of potassium; this solution has been used by M. H. de Molard, both for the purpose of fixing positives, and of taking rapid negatives on paper.

CYANOTYPE.—A photographic process in which ferrocyanide of potassium and similar compounds are employed as sensitive agents. It was discovered by Sir J. Herschel, who has described many modifications of the process. None of these, however, are used at present, owing to the difficulty of obtaining satisfactory results.

DAGUERREOTYPE.—The name given to the original photographic process of M. Daguerre on silver tablets.

DAMMAR.—A gum which, like copal, is much used in making varnishes for collodion plates. It is transparent, either colourless or slightly tinted yellow, tasteless, and inodorous. It fuses readily, is partially soluble in alcohol, almost entirely so in ether, and perfectly soluble in oil of turpentine. A solution of 2 parts of this resin in $2\frac{1}{2}$ parts of turpentine, makes an excellent varnish for prints, which is more transparent and durable than the ordinary mastic varnish, and less coloured.

DECANT.—To pour off gently, as a liquid from a precipitate; or to pour from one vessel into another.

DECANTATION, WASHING BY.—This term is applied to a very useful method of washing precipitates. The supernatant liquid is poured off, and then the precipitate is stirred up with water, and allowed to settle a second time, when the water is poured off. This operation is repeated for two or three times, until the precipitate is considered to be sufficiently washed from the salts with which it was associated.

DECOMPOSITION.—The art of separating the constituent

parts of a compound body or substance. Decomposition differs from mechanical division, as the latter effects no change in the properties of the body divided; whereas the parts decomposed have properties very different from those of the substance itself.

Deliquesce.—To melt gradually, and become liquid by attracting and absorbing moisture from the atmosphere.

Density.—Closeness of constituent parts, compactness. Density is opposed to rarity; and in chemistry the density of a body indicates the quantity of matter in a given bulk of it. If a body of equal bulk with another contains double the quantity of matter, it is of double the density.

Development.—The term applied to the act of bringing out the latent image in any of the photographic processes. The developing agents most frequently employed are gallic acid in the paper processes; pyrogallic acid and salts of protoxide of iron in the glass processes; and mercury in the daguerreotype process.

(To be continued.)

The Amateur Mechanic.

If Pope's extremely narrow dictum "One science only can one genius fit," were true, a century or a century and a half ago, it is certainly not so now. Eminence in any science cannot possibly be attained without a large familiarity with all other sciences in any degree cognate to it. This is pre-eminently true of photography. In order to excel, the photographer must possess, not only a good knowledge of chemical, optical, and other allied sciences, and of the principles of art, but he must often possess some mechanical skill. To the experimentalist in any branch of science, a knowledge of the constructive arts is often useful; but in the pursuit of a science so young as photography—and presenting a field of experiment so comparatively untrodden—it becomes absolutely necessary. New appliances, fresh contrivances, modifications, and adaptations of existing articles are constantly required, and must be, at least inthe first instance, contrived by the experimentalist himself.

To aid the tyro, we intend to give, under the head of "The Amateur Mechanic," a series of papers on constructive art, so far as it may be conducted by the aid of a few simple tools. We shall explain the use of such tools as are most frequently required, and are easily procured, and point out the various materials—their characteristics, capabilities, and modes of manipulation—which will be most generally used. We may safely assume at the outset that the majority of our readers possess some ingenuity, as we imagine that few persons "take up" and practise photography with any degree of ardour without some manipulatory skill. This skill will, however, in all cases be better for being rightly directed. There is a right and a wrong way of doing the most simple thing, and we shall endeavour to make plain and easy the right method. Even where the manipulation is so novel that the right mode is not determined, there is still a better and a worst method, and we trust our suggestions will point out the best.

As to the manufacture of apparatus, where good articles of recognised and approved form and material are readily procurable, we should by no means recommend home manufacture. Time, money, and patience will generally be saved by purchasing of the professional manufacturer. The cases where mechanical knowledge and skill are desirable are in the first place those to which we have already referred—the construction of new forms of apparatus for experimental purpose—the management of repairs in the operating room, which require attention on the instant—and to the travelling photographer, whose journey might otherwise be rendered entirely useless, the improvising some piece of apparatus quite unprocurable on the spot, out of some material readily procurable anywhere.

Our plan will embrace instructions for the simplest modes of working in metals, wood, glass, gutta percha, paper, leather, &c., &c. Whilst we shall from time to time suggest the application of the various materials to photographic purposes,* and illustrate these suggestions with suitable engravings, we shall not feel it necessary at all times to point out the direct bearing of manipulatory details on the production of known and existing apparatus; our object being to make the instructions as complete as possible, having equal reference to the construction of articles that may be required as to those already in use.

* We may here remark that we shall be glad to receive and give effect to the suggestions of our friends of constructive genius, arranging such suggestions in this department under their proper heads.

Gutta Percha.

We shall commence our instructions by some remarks on the properties, uses, capabilities, and manipulation of gutta percha. Perhaps no substance is capable of such varied application to the mechanics of photography, and is at the same time so easily and efficiently worked, as gutta percha. Unfortunately for its fair fame the report has gone forth that it has not fulfilled all that was expected from it, and in the form of baths it has to a large extent become the *bête noire* of photographers; stains, streaks, fogging, and a variety of other evils which photography is heir to, have been attributed to that "horrid gutta percha" bath. That these charges are true is by no means so certain; in many cases there is no doubt that the evils have arisen in just such proportion as the baths were not made of gutta percha, but of something else under that name. The prevailing commercial vice of the age—the striving after mis-called cheapness, the production of articles low in price and worse in quality—has been illustrated nowhere more forcibly than in connection with photography; and amongst other articles gutta percha has been largely adulterated, and has consequently acquired a bad name. We see no reason to believe, however, that a nitrate of silver bath, made of pure gutta percha, ought to injure the contents at all. We have one now in use in which we have kept nitrate of silver solution for four years without the slightest injury of any kind. Next week we shall treat of the properties of gutta percha, its impurities, &c. We shall be glad to receive from any of our readers the results of their experience in this matter, as it is only for the examination and consideration of many facts that trustworthy conclusions can be obtained.

(To be continued.)

Correspondence.

Foreign Science.

(From our Special Correspondent.)

Paris, 14th June, 1859.

To the many useful and interesting applications of photography already practised, I may now add another lately realised by the well-known Parisian photographers, MM. Bisson Frères. They have applied photography to the *reproduction* of geographical maps under the following curious circumstances:—

The Austrian Council of War had published formerly a magnificent map of the Lombardo-Venetian States. This map was freely exposed for sale before the present war broke out, but its circulation has since been prohibited. M. André Goujon, however, a French editor of maps, happening to possess a copy of the one in question, confided it to MM. Bisson Frères to have it photographed, if possible.

The undertaking was a difficult one. In the first place, the large dimensions of the map obliged them to divide it into several smaller portions in order to copy it perfectly; and it was indispensable that each piece should be photographed in such a manner that it would correspond, and might be joined, to all the others. The result is that MM. Bisson have perfectly succeeded in their endeavour, and have produced, in a few days, by photography, a map which is an exact copy of the original, and which it would have required years of labour to have engraved.

Vicomte du Moncel has lately published a paper on a new system of lighting up stereoscopic pictures. According to the author, although the stereoscope procures us an illusion which is almost complete, especially with stereoscopic proofs on glass, we cannot, however, do otherwise than remark a certain monotony in the lights and shades, which certainly does not exist in nature. The skies, for instance, are generally as white as the fronts of houses or monuments illuminated by the sun; and in many cases the distances or backgrounds do not slope gradually on to the foreground. In a

word, stereoscopic views show a want of light and airy perspective.

To remedy these defects, M. du Moncel has imagined a very simple contrivance which may be applied to any stereoscope. When M. Duboscq, in perfecting the refracting stereoscope, conceived the idea of applying to it stereoscopic proofs on glass, seen by transparency, he endeavoured naturally enough to prevent the confusion which might arise from the presence of exterior objects placed behind these proofs. This was accomplished by making use of ground-glass. But the bad effect subsists, nevertheless, to a great extent. M. du Moncel proposes to do away with the ground-glass altogether, and to let the proofs be viewed by placing the stereoscope before a reflecting system composed of a cardboard screen, painted sky-blue, inclined at an angle of 45°, and in front of which is disposed a plate of silvered metal, about 8 centimètres wide. This plate is joined to the basis of the cardboard by a linen hinge, and must be placed horizontally, so as to receive the light of the sun or of a lamp.

By placing the stereoscope so that the light reflected from the metal traverses the luminous portions of the landscape, and that the distances, skies, dark portions, &c., correspond with the diffused light reflected from the cardboard, the subject represented is illuminated in an enchanting manner.

My distinguished friend, M. Babinet, member of the Institute, has just published the following curious facts in a paper entitled, "On the Blue Shadows of the 27th May, 1859:"—

It is not uncommon that, in full sunshine, but more especially in the evening, shadows of terrestrial objects appear strongly tinted with blue. Generally, this colour has been, and is still, attributed to the blue reflection of the atmosphere. Buffon once said, "this blue colour of shadows is nothing more than the colour of the air itself." This explanation is, however, completely erroneous.

On the 27th of May last, for instance, the Parisian sky was visited by a white mist that showed not a trace of blue colour, and which allowed the solar rays to pass through it in such a manner, that an observer could look at the sun without paining his eyes. The blue colour of the shadows on the evening of the 27th was evidently a phenomenon of contrast. The sun sent through the mist an excess of red rays. Every one knows that the red and orange rays of the spectrum are those which penetrate most easily through media that are not perfectly transparent.

This is proved by a pretty little experiment made by the celebrated Fresnel (but never published) before the *Société Philomathique* of Paris:—Pure magnesia, of the most perfect white colour, was carefully mixed with water, so as to obtain a demi-transparent medium. When the light of a candle or gas lamp is viewed through the mixture, this light appears *red*. A few drops of milk, of a solution of dextrine, or of any other similar substance, produces the same effect as Fresnel's magnesia.

On account of the misty white sky of the 27th May last, the ground and houses of Paris were illuminated by a light, containing an excess of red and orange rays, and having, for complementary colour, the blue of the spectrum. It was natural enough, then, that blue should have been predominant in the shadows of the 27th May.

If any of your readers will look at the image of the moon reflected on the surface of the little pools of water in the streets of London, they will find this image will be of a *blue tint*, which will become more intense as the eye remains fixed on it. The reason is, that these little pools of stagnant water are illuminated by the gaslights, which radiate a considerable quantity of orange and red light. It is a phenomenon of contrast. If a piece of white paper be placed near a gaslight during the full moon, and a solid, opaque object be placed upon the paper so as to have its shadow projected by the white light of the moon towards the gaslight, this shadow will be of an intense orange-red, whilst that produced by the gaslight will be blue. Another experiment, imagined by M. Babinet, and which I have often repeated with success, and to the astonishment of lookers-on, tends still more to prove the correctness of his theory:—

A sheet of white paper is placed on a table near a window, and by means of a lighted taper the shadow of a cork is projected towards the window. At the same time a second shadow of this opaque body is produced by the daylight streaming in through the window, and is projected towards the taper. The first of these shadows is of the most beautiful sky-blue; the second shows the complementary colour, viz., reddish-orange.

This experiment is rendered still more striking if, by means of coloured glasses, the two lights which produce the shadows are varied at the will of the experimenter. M. Rumford, whose brilliant experiments have been recorded in the Abbé Moigno's *Répertoire d'Optique Moderne*, used to make two holes in the shutter of his room, and by means of coloured glasses applied to these holes, he obtained shadows of opaque objects. These shadows were tinted with an infinite variety of colours "of descriptions the least expected and the most beautiful."

In order that the remarkable phenomenon of coloured shadows may manifest itself, two descriptions of light are necessary: the one which illuminates the ground on which the shadow is projected—the other, which causes the shadow. In these conditions only can the phenomenon of contrast take place. The two lights, supposing them to be composed, have generally a certain amount of colour which is possessed by both of them, and a certain amount which is proper to each. Now, the law which presides over the phenomenon of coloured shadows appears to be that the colour of any given shadow, produced in the above circumstances, results from the elimination of the tints common to both lights, and the preservation only of the differential tints. Thus, on the 27th of May, the light of the sky which illuminated the soil of Paris was greyish-white; the sunlight which produced the shadows was reddish-orange. From greyish-white subtract reddish-orange, and what remains is blue, more or less mixed with green and violet. The shadows, as I have said, were blue.

M. Secchi, director of the Roman Observatory, a well-known and distinguished astronomer, and an excellent photographer, has lately invented a new meteorological instrument, which will probably create a complete revolution in the manner of taking meteorological observations.

It is called a *meteorograph*, to which denomination may be appended the word *universal!* By its means everything is noted down without any interference on the part of the observer. It is composed of a peculiar kind of barometer invented by M. Secchi, which notes down the ever-changing atmospheric pressure; an anemograph, which gives at any moment the direction and intensity of the wind; a thermograph, which notes down at each moment the temperature of the air; an ombrograph, which takes note of every shower of rain.

Mechanics, electricity, and electro-magnetism have been all called into the field in order to construct this marvellous instrument, which is at present at work in the Observatory of the Roman College. It would be impossible to describe it thoroughly without figures; but any of your readers who would like to follow the example of M. Secchi, will obtain, on demand, from this distinguished gentleman, a complete description of his new meteorological instruments, by addressing their letter thus:—à Monsieur, Monsieur le Rev. Père Secchi, directeur de l'Observatoire du Collège Romain, &c. &c. &c., à Rome (*vià* Marseilles).

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—I avail myself of the services of a "medium" to address this letter to you on the subject of a grievous outrage to which I have been subjected in the person of my friend and pupil, Eusebius. That injured spirit is too profoundly

affected by the reiterated attacks that have been made upon him to address you himself, but his complaints shall not be lost in the airy inhabitation in which we dwell for want of a friend to plead his cause, and through you to prevent a repetition of such disgraceful attacks on the peace of one so gentle. The object of the writer, who commenced the infliction of the grievance many months ago, appears to be the communication of an art unknown in our time, which you mortals term photography. His motive may be a good one, but, as my dear Eusebius declares, nobody asked him for the information—which, by the way, one who has recently arrived among us, and who seems to know something of the subject, says is all "bosh," a word not used in any of the languages with which I was acquainted when on earth, but which I conceive to mean worthless, or devoid of value. "Was it not bad enough," my pupil exclaimed, "to be pestered with details for which I cared not one jot, and which to me were utterly unintelligible; but why, oh, why did he insult me by first supposing that I was insane enough to follow his instructions, and then on the strength of that supposition, tell me—me, Eusebius—that he would reward me for my weakness with a 'penny *meersham* and four ounces of '*cuaster*'? The latter, I suppose, one of the filthy compounds he has been worrying me about so long." Verily I think my young friend has cause for complaint, and I, his master, also. Pray try and persuade your brother to cease persecuting him. He may object that my Eusebius is not he to whom his letters are addressed, but I know that there is no Eusebius on earth, and that not one has existed there since he who is now weeping beside me quitted it.—I am, Sir, THE GHOST OF ERASMUS.

Photographic Societies.

THE FRENCH PHOTOGRAPHIC SOCIETY.

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

In 1856, Messrs. Davanne and Girard discussed the objections of Mr. Hardwich, confirming and corroborating their preceding experiments. As to their examination undertaken for the object of competing for the De Luynes prize, it embraced too many subjects for them to hope to be able to complete it in a year. Such as it is, however, it already includes results more than sufficient to give an idea of what the whole will be. It may be useful if we here give the principal new facts that they have discovered.

"The great influence of the amount and nature of the size in the paper on the vigour and colour of the proofs; an influence occasioned by a combination taking place between the silver and the size.

"The value of the free nitrate of silver in the formation and the quality of the proof, which is of more importance, so to speak, than that of the chloride of silver itself, inasmuch as a proof on chloride of silver alone remains pale and wan; while that with nitrate alone and size gives great vigour and contrast.

"The real origin of the spots which disfigure so many finished proofs. Indication of the means of preventing these spots.

"Examination and determination of the best proportions of soluble chloride and nitrate of silver.

"Demonstration of the results produced either by an excess, or by a deficiency of soluble chloride, and, reciprocally, by the deficiency or excess of the salt of silver.

"Statement of the phenomena relative to the preservation of sensitised papers, and especially of the important part the free nitrate of silver plays in this matter.

"Experimental demonstration of the action of impure reagents.

"The differences of tone which are accidentally obtained, have been proved by them to arise solely from the different reaction of the chloride employed; that, consequently, all the chlorides of alkaline metals will give the same tone if they are absolutely neutral, while the same chloride, being at one time acid, at another time alkaline, will give different tones.

* Concluded from vol. ii. p. 166.

"A similar rectification of an error as regards the nitrate of silver. In place of all the uncertainties and discussions on the different virtues of crystallised and fused nitrates of silver, they have established beyond dispute, that the diversity of the action of this salt is due, not to the physical condition of their particles, but to their acid or neutral state.

"The exact extent of the impoverishment of the silver bath, by papers of given dimensions, and of the influence of albuminous preparations on this impoverishment, whence the necessity of frequently strengthening the acid bath is rendered evident.

"Demonstration of the causes which ought to induce us to exclude animal charcoal from the silver bath. The extent to which it weakens the bath.

"Theory of the formation of the positive proof by insolation.

"That the re-action which at the first glance appears very simple, becomes, on the contrary, very complex, when we seek to analyse it.

"The experiment proves in fact:—

"1. That the chloride of silver is reduced by the light to a metallic state, and that, if it forms a sub-chloride, it is only during the transition state.

"2. That the chlorine which is liberated goes to form successive films of chloride of silver, by decomposing the excess of nitrate, and, in that way, assists in giving great intensity to the proof.

"3. That under the influence of the light, the free nitrate of silver combines with the size, and determines a more or less intense colouring; that the formation is thus due to three re-actions, each of which influences the ultimate result in a different manner, and hence it cannot be a matter of surprise that these results are so exceedingly variable, according as one or other of these re-actions predominates; it may be said that the chloride of silver gives the *design*, the nitrate of silver the *intensity* of the tônes, and the combination of the nitrate and size *colour*."

Now, if we place ourselves in the strictly literal point of view of the programme (*étude complète*), the work of Messrs. Davanne and Girard would not answer the stated conditions unless it were finished, inasmuch as it ought to embrace, as in fact it will embrace and follow step by step, every phase of the operations incident to the attainment of a photographic positive.

But in considering, as it was our duty to do, the liberal spirit in which the programme was conceived, it will be admitted that the great and principal sections already published by the authors, from 1855 to the present day, evidently satisfy the above-mentioned conditions; and besides, we could use the same liberty in their case as was allowed to us in that of M. Poitevin.

Is it necessary for us, after this statement, to insist further on the claims of Messrs. Davanne and Girard? Assuredly not. Nor do we believe that as regards the general body of photographers in France, as well as abroad, any apology is necessary. We have the firm conviction that every photographer will approve of the justice we have rendered to our two colleagues.

To better assure this concert, however, we may be permitted to recall the scrupulous care and precaution with which they conducted these experiments. Not a step was made in advance until the preceding one was found to be fairly established. No mere theoretical statements were made by them, but every statement was carefully verified by practical tests. No labour or obstacle was sufficient to make them draw back; the most minute, and in some cases apparently trivial, experiments were made by them, so that not a link should be wanting in the chain of evidence by which they proved to you the truth of what they advanced. Indeed, we believe that the labours of Messrs. Davanne and Girard are of a kind which cannot be too highly praised, and that it will be long before a more substantially useful work will be undertaken for the benefit of photographers, or one more deserving of their gratitude.

It remains for us to inform you of the partition of the rewards and the classification we have adopted. You will have successively gathered the names of Messrs. Garnier and Salmon, Pouncy, Poitevin, and Davanne and Girard, as having obtained our suffrages.

You will also recall to your recollection that the character of the rewards has changed: the new and more liberal arrangements of the Duke de Luynes having led to the adjournment for three years of the award of the 2,000 francs prize, to be assigned under the strict conditions of the programme, the only question remaining to be decided this year was the

division between those entitled, of the sum of 2,000 francs placed at our disposal, in a shape implying both honour and profit. This fortunate modification of circumstances enabled us to follow the dictates inspired by a conscientious examination, and even to travel beyond the official list of candidates.

Finally, it appeared to us proper to establish two classes—one for the new processes, and the other for studies applied to old processes—thus preserving the two categories provided for in the programme. In the first class were included Messrs. Poitevin, Salmon and Garnier, and Pouncy. The first place therein was assigned to M. Poitevin. To him alone incontestably belonged the priority of invention of the process brought forward. We could not, therefore, suffer this opportunity of especially honouring the labours of so able and modest a *savant* to escape us—one whose zeal for science, and what more closely concerns us, for photography, is indefatigable.

The processes applied by Messrs. Garnier and Salmon, and Pouncy, are identical in principle, and very nearly identical in the manipulatory details, with the Poitevin method. The only modification of any importance is that introduced by Messrs. Garnier and Salmon, which consists in spreading the carbon in powder *after* insolation. Moreover, the latter gracefully acknowledges having borrowed the remainder from M. Poitevin. We don't know how this matter may be as far as regards M. Pouncy.

In the second class, Messrs. Davanne and Girard figure alone. To explain the motive for placing them on the same level as M. Poitevin, we need only refer to the summary we have given of their labours.

Our votes, which we are happy to say, remained unanimous throughout, are resumed in the following gifts:—

A gold medal of the value of 600 francs (£24), to M. Poitevin.

A silver medal of the value of 400 francs (£16), to Messrs. Garnier and Salmon.

A silver medal of the value of 400 francs (£16), to M. Pouncy.

A gold medal of the value of 600 francs (£24), to Messrs. Davanne and Girard.

It is with the conviction that we have decided equitably between each, with the most ardent desire to receive the general approbation, that we conclude this report.

May the next competition inaugurate the advent of printing by mechanical impression and carbon, and success crown at the same time the efforts of the seekers and the generous views of the Duke de Luynes! Finally, may all photographers by an increase of intelligent investigations, and by a loyal emulation to do well, preserve to the future the present method with its brilliant and variously coloured results, the loss of which would be a source of grief to true art, and which the memories of our youthful years will always endear to our sympathies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THIS Society held its second meeting on the 9th inst., in the large room of the Walworth Literary and Scientific Institution. Mr. A. H. WALL in the chair.

It having been suggested by the Chairman that the more important business of confirming rules and electing officers should be deferred until the arrival of all the gentlemen expected to attend, the members passed some little time in examining the few objects of interest provided by some of the members.

Some stereoscopic pictures were exhibited as specimens of Fothergill's dry process, taken by Mr. F. Howard. These were very beautiful, chiefly remarkable for their extreme perfection of detail in both lights and shadows, and by being of a very pleasing tone.

A camera stand and dark slide were shown by Mr. W. Ackland, as a portion of an extremely portable and effective apparatus intended for a continental pleasure tour.

A portable tent, invented by Mr. Leake, was exhibited by that gentleman, as one of the cheapest, and, by no means the least effective, of such inventions. It is thus described:—The table or bottom of the tent is a shallow tray 30 inches in length, 18 inches in width, and 2½ inches in depth, made of "half-inch pine deal," strengthened by wooden blocks at the corners, containing a box for plates, and a gutta-percha tray, with pipe attached, to serve the purpose of a sink, and preserve the table dry and clean. This tray has a light lid, which also forms the top of the tent, the three sides of which are made of two thicknesses of black and one of yellow calico, nailed round the inside of the tray and outside edge of its lid. An aperture in the black calico admits light to the tent through the yellow; and iron rods, about 2 feet 5 inches in length, support the tops when it is up, and fall into the tray when it is not. Over the opening in front is suspended a curtain of the same description as the sides, which, being hooked into its place, and wrapped about the person of the operator, effectually excludes the creative and destructive agency of light during the process of our works of darkness. Mr. Leake stated that he had taken some hundreds of views, 12 × 10 in size, with this tent, which stood well against wind, and thoroughly answered his purpose. It was erected and packed with great ease and speed, and could be made, with fair profit to the manufacturer, for about a guinea. He used a smaller one than that exhibited for stereoscopic pictures. When packed, it formed a case 30 inches in length, and 18 wide; and, with the tripod stand (on which, when up, it is screwed), weighed about 14 pounds. It could be conveniently carried by a handle attached to its side.

The business of the evening being to confirm rules and elect officers, the Chairman read a set of laws drawn up by the Provisional Committee, which, with some few alterations, were adopted.

The following gentlemen were elected to serve as officers:—*President*: Rev. F. F. Statham. *Vice-President*: Mr. W. Ackland. *Treasurer*: F. Howard. *Hon. Secretary*: A. H. Wall. *Committee*: Messrs. Cotton, Clarke, Hervè, Hannaford, Leake, senr., and Leake, junr.

The meeting was adjourned at about half-past ten.

Miscellaneous.

NOW-A-DAYS the skill of the photographist may be confined to a very few of the many steps in the process of forming a photograph. The chemistry of the substance he deals in may be a sealed book to him, and, indeed, in general is. He can buy all his materials in the most admirable state of preparation, and all that is left to him to learn is how easily he can throw away, by the smallest carelessness, all the results of the experience, the patience, and the skill that have been expended on the preparations that he buys. Such a person little knows how many failures and how much perseverance have led to the production of the collodion he may waste like water, or the silver bath which he abuses because it does not yield him pictures, while, perhaps, he has himself, by one unperceived act of carelessness, upset that delicate balance in its ingredients—the adjustment of which is one of the greatest niceties in this most capricious and yet most precise of arts. But if he has himself gone into the details of his preparations in the only true artist's way, has worked at the manufacture of his own materials—if he has become familiar with the fine precautions to be taken with the strength and temperature of the acids, by the aid of which he manufactures his "pyroxyline," with the purity of the alcohol and ether in which he dissolves it; with the right adjustment of the proportions of these, on which, strange to say, he will find the sensitiveness of his pictures greatly to depend; or, again, if he has studied those subtle mysteries of the silver bath, which experience and keen observation alone can teach—then, and then only, can he be in a position to feel the true enjoyment of the photographist; and only then will he be able to appreciate the delight of triumph and success, the sort of excitement said to belong to the winner in those games or pursuits in which something of chance or luck is associated with and rendered available by considerable skill. His occasional failures he will then meekly bear; and may, perhaps, console himself, as we remember a Wiltshire tenant to have done, who, priding himself on his success in horse flesh, and having once made a bad bargain, looked on the ground with the remark, "Well, sir, at the best of time, they be casialty jokers, hosses be!"—*National Review.*

MOUNTAINS IN THE MOON.—By the aid of telescopes we discern irregularities in the surface of the moon, which can be no other than mountains and valleys, for this plain reason—that we see the shadows cast by the former in the exact proportion as to length which they ought to have when we take into account the inclinations of the sun's rays to that part of the moon's surface on which they stand. From micrometrical measurements of the lengths of the shadows of the more con-

spicuous mountains, Messrs. Baer and Maedler have given a list of heights for no less than 1,095 lunar mountains, among which occur all degrees of elevation, up to 22,823 British feet, or about 1,400 feet higher than Chimborazo, in the Andes. If Chimborazo were as high in proportion to the earth's diameter as a mountain in the moon, known by the name of Newton, is to the moon's diameter, its peak would be more than sixteen miles high. Arago calls to mind that, with a 6,000 fold magnifying power—which, nevertheless, could not be applied to the moon with proportionate results—the mountains upon the moon would appear to us just as Mont Blanc does to the naked eye when seen from the Lake of Geneva. We sometimes observe more than half the surface of the moon—the eastern and northern edges being more visible at one time, and the western or southern at another. By means of this libration, we are enabled to see the annular mountain, Malapert (which occasionally conceals the moon's south pole), the Arctic landscape round the crater of Gioja, and the large grey plane near Endymion, which conceals, in superficial extent, the *mare vaporum*. Three-sevenths of the moon are entirely concealed from our observation, and must always remain so, unless some new and unexpected disturbing causes come into play.—*Humboldt*.

Photographic Notes and Queries.

THE DEVELOPMENT OF PHOTOGRAPHS IN DAYLIGHT.

SIR,—You were kind enough to insert in No. 33 of the "PHOTOGRAPHIC NEWS," of the 21st of April last, some explanations of mine relative to the development of photographs in the open air, by Mr. Young, of Manchester. As some objections were taken at the time to the explanation I gave, I shall be glad if you will allow me to detail more at length the facts and experiments on which I based my opinion.

I conceive that the proof appears, in consequence of the developing solution, on contact with the nitrate of silver, setting the particles of silver at liberty, which immediately attach themselves to the parts acted upon by the light, and not in consequence of the developing solution containing the reduction, already begun, of the iodide of silver. I can say positively that neither gallic nor pyrogallic acids, nor sulphate of protoxide of iron are capable, if used alone, of developing an image on a film formed entirely of iodide of silver; if an image appears it is the result of a mixture of the iodide with a greater or less quantity of nitrate. Hence the function of the developing agent is not to convert an invisible sub-iodide into visible metallic silver. The negative is not designed by the reduction of a sub-iodide, but by a metallic deposit. To satisfy yourself on this point, it is only necessary to ascertain the quantity of silver contained in the sensitive film before and after the development of the proof; and you will find after the complete development of the image, and even after fixing, which process removes the whole of the iodide in excess, that there still remains a larger quantity of silver than there was of iodide of silver in the film before the development; the necessary inference is that a deposit has taken place, and that the appearance of the picture is due to the particles of silver arranging themselves on the sensitive film; first one molecule of silver is set free, and then others group themselves round it, precisely as in the case of crystals.

The question next arises—where does the first molecule of silver come from? The answer to this is—light has either determined the formation of a sub-iodide of silver or the reduction of a part of the iodide of silver to a metallic state. In either case the quantity of silver so modified is so exceedingly small that it escapes observation even under the microscope, but the reagents which develop the proof prove very clearly that a modification has taken place. There can be no doubt that we may safely admit the formation of a sub-iodide of silver by the luminous influence, and then the decomposition of the sub-iodide into metallic silver by means of the hyposulphite of soda or the developing agents; but the picture remains invisible without the addition of nitrate of silver. Therefore, since, as is generally admitted, the sub-iodide must necessarily be decomposed, why complicate the question by assuming the presence of this useless sub-iodide, the existence of which is more than doubtful, inasmuch as it has never been isolated, and no mention whatever is made of it in the works of the great Swedish chemist, when it is evident that in the case of both iodide and chloride, the prolonged action of the light gives metallic silver. It seems to me much simpler to say that a luminous action which has not been continued for a sufficient length of time gives only a small quantity of metallic silver. And, besides, it must be allowed that the sub-iodide of silver, or the intermediate substance assailable both before and after being dealt with by the hyposulphite of soda or warmed and diluted nitric acid, conducts itself with reagents precisely in the same way as metallic silver; hence it may be assumed that, having the same properties, it is the same substance. In the special case of Mr. Young's experiments, which require albumenised proofs, I am much more inclined to believe in a combination of silver and albumen.

To sum up the substance of this letter, which is already rather long, it appears to me simple, conformable to chemical reactions and the experience of photographers, to explain the production of the picture in the following manner. Light, in proportion to its intensity, sets a greater or less number of molecules at liberty, and these molecules form the primary nucleus of attraction. The developing agents bring out the picture only in proportion as, mixed with nitrate of silver, it can set fresh molecules at liberty in a greater number, which molecules arrange themselves round the principal nucleus, and cause the appearance of the picture with a rapidity which goes on continually increasing in proportion as the nucleus becomes more extended.—Accept, sir, the assurance of my distinguished consideration.

A. DAVANNE.

BLISTERS IN THE COLLODIO-ALBUMEN PROCESS.

SIR,—Having derived much useful information through the medium of your paper, I think I cannot better return my thanks than by laying before your readers a few remarks respecting my experience in some of the dry processes, which I consider as being generally more convenient than the wet.

As lately as the beginning of October last I began to take dry negatives, when I prepared a number of plates and started on a photographic tour of two or three days, visiting several places in Derbyshire.

Fothergill's process having just come out, and being strongly recommended for its simplicity and certainty, I gave it a trial, and so far succeeded as to get 12 plates out of 18, having only tried *one* before starting. The 12 were tolerably good negatives, of which the one of Rowsley Bridge is a sample (perhaps the best); of the other six, some were injured by light getting in at the box, one I exposed twice over by mistake, and one or two were under-exposed.

Having seen the success of our eminent photographer Mr. Woodward, I (in a rash moment, as I have at times since thought) aspired to do as much, and consequently commenced to study the collodio-albumen process, but was stopped by its inveterate enemy "the blisters," but I did not give up without having tried to solve the mystery, for so it proved. I went through it again in particular detail, first trying one thing and then another, till I should think I prepared at least ten dozen stereoscopic plates, out of which I succeeded in getting only five free from blisters, which I managed to get one day in preparing nine, the other four blistering, although I used the same chemicals and finished all together. It is now only a month ago since I got rid of them. I think it has nothing to do with the collodion, as some maintain, though I dare say some collodion may require longer drying than others. The way I set about this is, to let the plate be quite dry before pouring on the collodion, and then let it set well at least three quarters of a minute; this is an important

thing, for the longer you let it set, the less time the plate takes in drying afterwards; immerse in bath and manipulate as usual. After pouring off the albumen let the plate dry, and put it in box, and keep it in a warm room, say a kitchen, four or five days; if you have let the collodion film set well, the plate will be in a fit state to excite, to prove which, just wet the tip of your finger and rub once or twice over the corner of plate; if the film dissolve and come off, it is not dry, but if it bear rubbing, it is hard enough, and you may safely excite; under any circumstances the film should be sufficiently hard to bear scratching with the nail.

Supposing the plates be required immediately, lay them on a clean dish, and put them in the oven not too hot; if the oven be too hot, the plate will crack, and have the appearance as though a lot of little hairs had been thrown all over it; leave them in for about half an hour, and then put them to the same test; they will always, on being immediately removed from the oven, appear very hard, but I found that on cooling they will soften again unless sufficiently baked. I have not done much since my conquest—for I look upon it in that light—having only made one tour to Lincoln, when I had the misfortune to get my case knocked down, and my dark box injured, and, on lifting it out, found the lid raised at one end quite an inch, and most of the plates injured; but, having lots of time to spare, I exposed two or three, which turned out better than I expected; the one of the South Porch being injured a little in one spot by light, which makes the light place on the print, and the east end view being not so sharp as would have been the case had no light got in.

The view of the little bridge at Clifton was taken on a Fothergill's plate on the 27th of last December—a bright day. The print is not such a good one as I should wish, being rather dirty; but I have not time to print another.

C. T. H.

APPLICATION OF PHOTOGRAPHY TO TYPE FOUNDING.

SIR,—I am by trade connected with type founding, and am also conversant with the art of electrotyping and its sister art photography.

Now, sir, I want to bring photography to bear upon letter founding, and beg to offer to your notice the following remarks, which I think will convey an idea of what is required in order to make it a valuable aid to the master type founder.

Doubtless, you are aware that the production of printing types is an affair of a rather complicated nature. First, the letter is cut in steel, and, of course, for each different sized letter of a series, a steel punch must be cut; this punch is then struck or impressed into a thick piece of copper, termed the matrix, from which thousands of the letter may be cast in type metal—the copper matrix being justified—technically so termed—and placed in a small steel mould, which a man uses for the purpose of casting types with.

I can produce, now, *from types*, matrices, without employing steel punches at all, simply by submerging the leaden type, with suitable connections, in a solution of sulphate of copper, &c., and subjecting it to the action of a galvanic battery—depositing copper thereupon. This is simple enough, mere possession of types of the desired face or design being the chief concern, but often possession only of an impression, made by printing ink, is all that can be obtained, and here I conceive that photography might step in—the print be copied photographically, enlarged, equalled, or reduced in size, for types of various *bodies*, and an electrotype taken from it at once, or a mould be made with it, in which, or *on* which, copper could be deposited. Small engravings and coats of arms, cast by type founders, might be produced in a similar manner. The advantage of a process of this kind would be considerable to letter founders.

Now, sir, cannot letters or designs be copied by the camera, the ordinary negative collodion process being employed, the surface acted upon by light raised as much as possible by means of a suitable developer, the plate bearing the design, with connections, placed in a copper solution, and submitted to the action of a galvanic battery? The result would be a printing surface of copper. But for obtaining a copper matrix, available for type founding purposes, *a mould* must be taken *from the plate*, and this, being *a raised design*, the copper deposited upon it would, of course, in face, yield the sunk matrix required for the purpose of casting printing types. It is not absolutely necessary that the copper deposit be, *in depth*, more than about the 50th of an inch, but, of course, the deeper the better.

The only difficulty would appear to be getting the outlines of the letter very sharp, and the surface very flat, but this I should imagine conquerable.

In conclusion, sir, should you think proper to publish this letter, I shall feel proud of having directed attention to this application of the beautiful art of photography, and will inform you of the progress I hope to make in it, for the benefit of all whom it may concern.

ALFRED STOCKMAN.

[We do not think our correspondent will meet with much success in his endeavours to apply the art of photography, in the above manner, to the purposes of the type founder, as the deposit on the collodion plate is of too delicate a nature, and the thickness of the reduced silver is almost imperceptible. It is, however, very probable that Mr. Talbot's photoglyphic process might be found to answer the desired purpose, as in that process the design may be eaten into a plate of steel or copper to any desired depth.—ED.]

DRY COLLODION PROCESS.

SIR,—As requested, I now give the information by letter. Having tried Fothergill's and other processes these last twelve months, and *occasionally* getting a *middling-good* picture, though I have never been able to work with certainty, I at last became dissatisfied, and this led me to try some experiments. The thought that suggested itself to me was, Why may I not add something to the collodion, so as to fill the pores instead of applying preservatives afterwards; thereby making it far less complicated, and, as a consequence, more certain? After trying numerous experiments, I found that shellac answered best, although I have no doubt that better things than this will be soon found, if the attention of the photographic world be directed to the subject.

Dissolve 1 drachm of good shellac in 1 ounce of alcohol, and filter, then add to every ounce of ordinary collodion 12 minims of the above solution; coat the plate, and immerse it in the nitrate bath as in the wet collodion process, and when the greasy appearance has entirely disappeared, wash it in 4 ounces of clear rain-water in a dish, until the greasy appearance has left it as before; empty this out, and pour in a fresh quantity, just sufficient to flow evenly over the plate (say 1 ounce), which must be moved about once or twice backwards and forwards, not more. This is done to remove all the free nitrate on the surface, allowing sufficient to remain in the pores. (The beauty of the process depends much on the washing; therefore great care is necessary, for if you wash the plate too much, you will get a very feeble negative, if any. But if the plate has the proper amount of washing, the resulting negative is beautiful.) Then pour this off, and stand the plate *lengthwards downwards* in a warm place to drain and dry, otherwise you will have the plate develop unequally, owing to the greater quantity of nitrate at the lower end of the plate.

The exposure and development are the same as in the Fothergill process. I think if the plate be immersed in the bath previous to developing, it will not only develop quicker, but get more half-tints. Fix with hypo. and well wash.

I have had great success with this process, but I must admit I have also had several failures, although the latter I think will soon be got over. We must all expect some failures, especially in a new process. I think if this be known, others may improve on it. At all events the sug-

gestion will do no harm, "Why may not something be found to add to the collodion instead of applying preservatives afterwards?" THOS. CLARK.

2, *Ordnance Terrace, Shooters' Hill.*

THE HONOURABLE MAJOR FITZMAURICE'S NEW LIGHT.

SIR,—I observe in your impression of the 3rd instant, a correspondent expresses a desire to be better informed as to Major Fitzmaurice's new light. I am happy to be in a position to state that I received a note from the honourable gentleman a few days ago, in reply to a series of queries on the subject, in which he says:—"I think you will be able to have all you desire in the shape of fine light at an economical price, by means of an apparatus of small cost and general simplicity. A company is about to work the thing out, and I will in a few days forward you a prospectus."

From the quiet, business-like manner in which the discovery is being developed, I would augur favourably of its ultimate success; and I would suggest patience to our enthusiastic brethren of the camera till it is made public.

Glasgow. WILLIAM COCHRAN.

BLUE STAINS ON COLLODION POSITIVES.

SIR,—I have seen that some of your correspondents are troubled with a blue stain in patches upon the film of their positive portraits after fixation, not caused by the contact of the developing and fixing solutions from imperfect washing.

I was for a long while troubled with this annoyance, and have accidentally discovered the cause to be too much glacial acetic acid in the developer. The blue markings will not appear with all kinds of collodion and the same developer, but should they do so, a solution with less acid in it will be found a sure *remedy*. From the blue markings more frequently occurring when cheap collodion was used, I am led to infer, that it being made with methylated spirit has something to do with the matter, but as yet I cannot speak with certainty as to the *cause*. ANON.

THE LINSEED DRY PROCESS.

SIR,—Would you be kind enough, through the medium of your paper, to ask Mr. Hughes whether the linseed process will keep good for any length of time? Could a couple of dozen plates be prepared, stored away in a tin box, and photographs taken with them a month or two after they were prepared? What is about the exposure for stereoscopic pictures, and which of the two developers does he recommend? for, on referring to vol. i. of the "PHOTOGRAPHIC NEWS," at the page he mentions, I find there are two recommended. WARRENGAL.

ANSWERS TO MINOR QUERIES.

CONDENSATION OF VAPOUR ON THE LENS.—*Magnum Bonum* has been trying the effect of heating the silver bath and plate previous to exposure in the camera, and is surprised to find that the resulting picture is very indistinct and apparently out of focus, although he had previously been taking excellent pictures, and has not touched the camera or lens. The reason of this is obvious; the lens being in the open air is of a lower temperature than the plate which has just come out of the warm silver bath, the moisture, therefore, has condensed on the hinder surface of the lens and obscured the image. This often happens when operating in the sun. Care should always be taken to warm the lens slightly and to wipe it carefully, and in the sun the inconvenience may be lessened by placing a white handkerchief over the camera, which will reflect the rays without warming the box.

METHOD OF FOCUSSING ACCURATELY.—*X. P. R.* You will find the most satisfactory as well as the easiest method of adjusting your camera to the true focus to be the following:—Do not simply screw the lens (or back of the camera) in or out as the case may be, until the object seems most distinct, and then stop; in that way there is great difficulty in catching the exact moment at which to stop: but having arrived at what seems to be the sharpest point, keep on moving the lens inwards until the image commences to appear palpably indistinct again, then reverse the movement and screw the lens outwards, overshooting the mark again a little, as before. Repeat this two or three times, oscillating like a pendulum from one to the other side of the true focus, and at each time coming nearer to it, until, like a pendulum coming to rest, you at last stop at the exact focus. This may seem complicated to read and unnecessary in practice, but a trial will soon show that both time is saved and greater accuracy insured by thus hovering about the focal point for a few seconds and finally alighting upon it, than by carefully and cautiously moving direct to it and then stopping. In the latter case, you will be almost sure to stop short of the true point, whilst, by the former plan, performed as it should be, quickly and decidedly, less time will be occupied, and the exact focus will be obtained with absolute certainty.

TO CORRESPONDENTS.

⁎ TO ALL OF A MECHANICAL TURN OF MIND.—*In the present number of the* "PHOTOGRAPHIC NEWS" *is commenced, under the head of* "THE AMATEUR MECHANIC," *an important series of articles on constructive art, so far as it may be managed by the aid of a penknife, glue-pot, hammer, and nails, &c.; and the various materials which are easily procured and most generally serviceable, such as gutta percha, wood, metal, glass, card-board, &c., will be fully pointed out and explained, together with their characteristics, capabilities, and modes of manipulation. Few young persons at the present day are without some employment for their leisure hours, requiring manipulatory skill. This skill will, however, in all cases be better for being rightly directed. There is a right and a wrong way of doing the most simple thing, and it will be the object of these articles to make plain and easy the right method. The series will be fully illustrated with engravings, and will form a complete guide to the constructive arts, alike useful to the photographic amateur and experimentalist in any of the physical sciences.*

H. MOORE.—Your picture is not properly mounted, and thus it has a pseudoscopic effect when looked at in the stereoscope. It is, however, very good as far as the manipulation and photographic skill are concerned, and we shall be happy to do as our correspondent wishes. We shall be pleased to receive a description of the apparatus mentioned.

W. HIGHLEY.—Several formulæ for negative collodion have been given in our former numbers. See vol. i. p. 201, for several; and also Mr. Mayall's paper in a recent number. Your other question we cannot answer, as it would involve recommending particular makers.

TROUBLE.—1. In taking a stereoscopic negative, from which you wish to print transparent copies on glass, for viewing in the ordinary way *without cutting*, you cannot work with two lenses simultaneously, but must take the *right* hand picture on the *left* end of the glass, and, *vice versâ*, the *left* hand picture on the *right* end of the glass. For this purpose the pictures must be taken one after the other, and, therefore, a single lens will answer the purpose as well as a pair of lenses. 2. A rather light back ground.

ASINUS.—If we understand our correspondent's question rightly, no process is known by which direct positives may be taken in the camera by a paper process.

GOING A-HEAD.—1. Add a drop of nitric acid to your bath. 2. If it changes colour on keeping when iodised, you had better purchase your collodion in two separate solutions, and mix it as required for use. 3. The more gloss there is on a stereoscopic print the better it is liked by the generality of buyers.

A POSITIVE OPERATOR.—Why not try it first? We cannot tell you how to remedy imaginary evils, which might never exist in practice.

R. STEWARD.—We have answered one query by post; the others we cannot at present answer.

W. B. H.—*Easingwold* is a sufficient address. See the British Postal Guide.

HYPO.—1. The proper tone for the sky in a good positive is a half tint. A perfectly white sky (*i. e.* whiter than any terrestrial object) is never seen in nature, and in an engraving or painting would look absurd. If, therefore, your pictures are good in other respects, we advise you to be satisfied with a slight transparency in the sky. Painting and touching out should never be resorted to, except to cure an accidental blemish. 2. It all depends upon the way the picture developes. The manipulation varies with nearly every picture, even in the hands of a skilful operator.

E. S.—Omitted by accident. It shall be inserted in our next list.

W. L. C.—1. We do not know of any preparation that could be applied to gutta percha, which would have the effect of allowing collodion to be placed in it for a short time, and yet prevent any mutual action taking place. 2. It will be unsafe to add acid to the hypo. bath in sufficient quantity to produce milkiness, if it be used for the printing process on paper. In the collodio-albumen process, however, it will produce no deleterious action, and in some cases may even be of great service. The want of intensity you complain of does not arise from that cause.

J. C.—M. D.—The matter complained of will not occur again. Instructions to this effect have been sent to our Belgian correspondent.

R. Y. S.—Your bath is quite spoilt, and nothing now remains for you to do than to precipitate the silver from it and make a fresh one.

H. WARD.—Consult the index of our first volume.

H. H. (Stamford).—Your picture is very good, and the address shall be inserted in our next list. We should not have space to insert a complete list each week.

P. ATHERTON.—Your bath seems made correctly, and from your description, we should rather be inclined to blame the collodion than anything else. A good negative takes about half a minute to develop properly, if the exposure be right and everything in good order; and the developing solution ought only to be slightly brown at the end of that time.

F. H. WALKER.—We have received no stereograms from this correspondent.

H. O. L.—Pale yellow glass is not at all safe to glaze your window with. It should be deep orange coloured.

Communications declined, with thanks:—Argentum.—P. G.—E. C.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—Ellen.—Z.—J. S.—W. D. B.—Chemicus.

IN TYPE:—J. Walter.—Reticulus.—E. M. S.—M. M. D.—A. Whitham.—"Ponçon."

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁎ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 42.—*June* 24, 1859.

THE TENERIFFE ASTRONOMICAL EXPERIMENT OF 1856.

We have been favoured with a copy of the report on the above subject, addressed by Professor C. Piazzi Smyth to the Lords Commissioners of the Admiralty; and as it is one of the first authentic accounts of the important results arrived at by the above astronomer during that remarkable expedition, we gladly avail ourselves of the opportunity thus afforded of placing our readers in possession of some of the more interesting facts, with a knowledge of which science has thus been so enriched.

As our readers are doubtless aware, the object of this expedition was to ascertain how much astronomical observation can be benefited by eliminating the lower third or fourth part of the atmosphere. This idea belongs to Sir Isaac Newton, who stated in his "Opticks," "They (telescopes) cannot be so formed as to take away that confusion of rays which arises from the tremors of the atmosphere. The only remedy is a most serene and quiet air, such as may perhaps be found on the tops of the highest mountains above the grosser clouds." The possibility of carrying out this idea suggested itself many years ago to Professor Smyth, and in November, 1852, he proposed a scheme for realising Newton's idea through means of a summer expedition to the Peak of Teneriffe, where there appeared a hope that telescopes might be elevated more than 10,000 feet above the level of the sea, with greater facilities of every sort than on any other known mountain. Several times was this scheme proposed, but without success, until the Astronomer Royal brought the subject before the notice of the First Lord of the Admiralty, the Right Honourable Sir Charles Wood, who, in the spring of 1856, agreed to furnish the necessary funds (£500) in order that an expedition might at once proceed to Teneriffe and make trial of the capabilities of the mountain.

No sooner were the preliminaries decided upon, than notices of the intended expedition were sent to the principal learned societies and scientific men in England, asking them to suggest experiments in different branches of science which, under the novel conditions in which they could be tried, might be expected to increase our stock of scientific knowledge. The scheme was universally approved of, but so many additions were proposed to the work originally contemplated, that the materials and money which had been allotted to carry it out, would have been insufficient for the purpose. Owing, however, to the liberality of private gentlemen, a large quantity of valuable apparatus, in several branches of science, was placed at the disposal of the expedition, and R. Stephenson, Esq., M.P., lent his yacht "Titania," with a crew of sixteen men, for the voyage out and home, and during the whole period of the experiment.

The leading object of the experiment was, in the words of Professor Piazzi Smyth, "to ascertain how much astronomical observation can be benefited by raising telescopes high into the air, and so enabling an observer to look at the celestial bodies through a less depth of atmosphere than they could from any of the ordinary observatories, established as they are at or near the level of the sea.

"If we could rise high enough above the clouds, not only should we at once have clear, in place of cloudy skies—no mean advantage in itself, as enabling us to increase the number of observations—but their quality, a matter of far higher importance, would be advanced at the same time. For, in proportion as the atmosphere itself is overpassed, so are the irregularities in its action on rays of light passing through it; and these irregularities are precisely what form the chief bar to accuracy of instrumental measure, and to certainty of telescopic vision.

"On the other hand exist the drawbacks, that on a high mountain it may be difficult to drag up the largest class of telescope, and impossible to build a large observatory; and though the air be thin and transparent, it may be in such a state of motion as to be prejudicial to the steadiness of instruments; or, again, the mountain top may be always enveloped in a local cloud. The exact value of these objections was only to be found by actual trial; and that, if they should be overcome, a new gateway would be opened up in the paths of science, not astronomical only, but of many allied subjects, may be gathered from the very important mass of suggestions sent into the Admiralty by their several referees. They show, indeed, what might be expected from a good mountain station, well worked for a series of years, rather than what a preliminary experimental trial on a small scale would be able to accomplish in a few weeks."

It is not our intention to enter into the details of the astronomical and physical results obtained in this remarkable expedition—they would be out of place in a journal devoted more especially to one department of science; but, inasmuch as all branches of physical optics bear so close a relationship one to the other, and considering how vitally important to the photographic experimentalist are all questions bearing upon the phenomena of atmospheric absorption and interference, we cannot fail to find a vast amount of new facts and important observations which will be of paramount interest to the majority of our readers. It is on this account that we wish to draw attention to the work before us, and in the following review of its contents will place before our readers those observations and discoveries which more especially bear upon our own science.

Amongst the suggestions made, as noticed above, it was stated by Professor Airy that it was very desirable that Fraunhofer's spectral lines should be observed with various elevations of the sun, and in different parts of the sky, and should be compared with observations made at the bottom of the mountain.

Sir J. F. W. Herschel wrote that he considered "the opportunity a very valuable one for obtaining an extensive and normal series of comparative actinometric observations, made *simultaneously* (strictly so) on the summit of the mountain and at the level of the sea, with actinometers provided with interior thermometers (not mercurial); . . . . . the object being the determination of the proportion of the solar heat absorbed by the atmosphere between the two limits of altitude. Should circumstances permit, an intermediate station, about half way up the mountain, would afford valuable supplementary observations:—such observations, taken at the time of the sun being vertical, would be very precious; but the series should be extended to every altitude of the sun, down to the horizon.

"As Mr. Smyth is an expert photographer, he should be provided with an apparatus for obtaining photographic impressions of everything worthy of record, *inter alia* the great Dragon Tree of Orotava (supposed to be the oldest tree in the world), from several points of view.

"It would be most desirable also to procure thermographic representations of the solar spectrum, and to examine the

'fixed lines' of the luminous spectrum, with a view to ascertaining whether they, or any of them, originated in absorption of the earth's atmosphere."

Respecting the solar spectrum and the remarkable "fixed lines" with which it is crossed, each suggester seemed to consider an accurate investigation of these phenomena of great value. The President and Council of the Royal Society wrote in the following words:—"As some of the fixed lines of the spectrum appear to owe their existence to the absorption of light by the earth's atmosphere, it would be interesting to compare the lines seen at the mountain top station when the sun is low, with those seen about the middle of the day, and those again with the lines seen at a small elevation above the level of the sea; and it would add much to the interest of investigation if photographic impressions of the lines could be taken.

"Certain observations seem to show that the atmosphere is, to a certain extent, opaque with regard to the more refrangible of the solar rays, so that it seems likely that the spectrum would be found to be of greater extent on the more refrangible side on the top of a high mountain than below. This point could easily be decided by forming a pure spectrun with a quartz apparatus, and receiving it on a piece of glass coloured by uranium, or on some other substance possessing a similar property."

Before we allude to the physical observations which more particularly concern photographers, it may be interesting to notice the atmospheric peculiarities which were observed at different altitudes on the mountain. Wind did not prove much drawback, as, although, at about the level of the trade wind cloud the hills were swept by it with terrific force, above that height the wind decreased in strength until it reached a neutral station, at about the height chosen for the station. Fog and clouds were also of very little inconvenience, for although they existed below and appeared daily—dense, closely packed together, and rolling upon each other—they showed no tendency to rise higher than 4,500 feet. "A more important quality of the atmosphere was caused by dust-haze, which was ever more or less present, though, sometimes, in vastly greater quantities than at others. . . . . Where this dust-haze came from or went to we could never tell; but when present we could easily distinguish its banks, or strata, as they stretched away and condensed in perspective towards the horizon. There were often several strata, one above the other, and mutually separated by very clear and sharply-defined spaces of atmosphere. . . . . Being above much of this dust, though, perhaps, not the greater part of it, we were evidently better off than an observer at the level of the sea, when pointing to a zenith object; but for a horizontal one we were worse off, from often being in, and then looking through the whole plane of the stratum, and so experiencing the maximum of its light-stopping effect. Hence the occasional deterioration of sunrise and sunset were infinitely greater than anything that occurred at noon, and on some days, when the sky was perfectly free from cloud, and the sun had been distressingly hot and bright when high in the sky, yet it had almost become invisible before it set. It was seen, though made out with difficulty on such occasions, through a darkling yet luminous haze of dull lemon-yellow colour; but what it set behind, or when exactly it did set, there was no ascertaining. The next evening, perhaps, the atmospheric dust had removed, and the change in the sunset was magical. The orb radiated hot and shone bright up to the moment of going down—sometimes behind Palma, showing hills of rich dark purple; sometimes behind the rollers of the cloud sea, clearly visible to the extreme edge of the horizon. Then, too, in place of the uniform yellow colour of the dusky sunset, the most gorgeous scarlets, yellows, and blues took its place.

"To eliminate this dusky medium would be of the utmost importance to the further improvement of astronomical observation, and may be considered the greatest and most subtile difficulty which the observer has to deal with, and it is probably general over the world, as on the South African mountains, at heights of 5,600 feet, the phenomenon was almost as notable as at Guajara."

The astronomical observations are most interesting and important. The following peep at the moon makes one regret that lunar photography had not formed one of the objects of the mission. "At Guajara, with the Sheepshanks' telescope, there were many tempting opportunities of delineating parts of the moon's surface; but the small power of the telescope prevented such work being as good disposal of my time as many observations that equally claimed attention. Moreover, there was so remarkable a tendency of bright points of the lunar craters to form stellar disks and rings that I was additionally induced to defer anything in this line until the Pattinson equatorial, with the transparent glass reflector eye-piece, should be erected.

"This instrument was established at the Alta Vista, in September, but the last quarter, which was to have been the lunar observing period, was interfered with by the premature setting in of autumn. In the first quarter of that month we had several opportunities, but not many or good ones, as the moon was then very low in southern declination, and the land ridges rose high to the west of us.

"These few views, however, with magnifying powers from 160 to 560, made a most vivid impression on the minds of all at the station. There have been doubts expressed by some geologists as to whether the circular cavities in the moon are craters; had they enjoyed these opportunities at the Alta Vista they would have renounced such doubts, so many and so striking were the analogies between the craters of Teneriffe and those we saw in the moon. Among the most characteristic, perhaps, of the resemblances is the greater steepness of the inner over the outer wall of every cavity or ring-shaped mountain. Again, the precipitous ledges, and often the conchoidal bays and recesses of the inner wall, and the generally level floors of the cavities, with here and there a peak raised upon, or a little cup-shaped cavity established in them.

"But the telescope showed, over and above those well-known features, such an infinity of detail, that though I tried once or twice, I found it quite impossible to make a proper drawing of any notable part, in the contracted space of time between darkness and the moon going behind the lava ridge. Half a night would have been short time enough. In this department there is indeed an immensity to accomplish; the clear air of the peak would be most favourable; and the opportunity that the astronomer would have, probably for the first time in his life, for ascertaining the distinctive forms of terrestrial craters, from eight miles in diameter to 300 feet, would enable him to appreciate better the minute revelations of the telescope."

Some account of the remarkable appearances of Jupiter and Saturn, under a high magnifying power, are next given, and when speaking of the several drawings of these planets which the unexpected revelations of the telescope at these high altitudes had tempted him to make, the Professor proceeds with the following valuable remarks on the necessary imperfections of hand-drawing, and the superiority of photography in all cases where accurate delineation of form or detail is desirable. "A single drawing should not be looked on by itself as of importance in the present state of astronomy; for how can others than the artist prove the reality in nature of anything they may find in that one document when this alone is before them? A bad designer will often unconsciously give an erroneous figure, and, though intending to show, perhaps, the blurred outline he actually saw, may yet, by using a pen in place of a brush, represent the erroneous appearance as having all perfect definition, and cause the juxtaposition of full white with deep black; and if he has put in these things, and a few others also, by slips or bad drawing, we must take the whole as he has given it implicitly or reject it entirely.

"If astronomical drawing is to take a similar trustworthy and trusted place to numerical observation in its own branch

of subjects, we must, in the first place, with every man's work eliminate errors in drawing and imperfections of the means and medium employed. How easily much of this may often be accomplished by *two* drawings, may be well seen in some of the photographs in the book of illustrations, for having been taken with stereoscopic intentions, they are all double. Hence, is there some doubtful mark in one? we have only to look to the other; and if the mark was in the scene itself in nature, it will likewise appear in the second view as well; but not so if it were merely a fault or imperfection in the surface of the plate."

Several attempts were made at solar photography, but owing to the inconveniences consequent upon the temporary nature of all their arrangements, and the novel conditions under which the attempts were made, the results obtained in this way were not so satisfactory as other observations lead us to anticipate would be the case, if it were decided to erect, at any future time, a permanent observatory at this or any correspondingly high altitude. The following observations on this subject show some of the difficulties encountered in this important branch of celestial photography.

"All our observations of the sun laboured under the inconvenience of being performed in the open air, and freely exposed to the direct solar rays; to guard against these the observer's head and the eye-piece were enveloped in a black bag. When this was accomplished, then came the greatest difficulty of the excessive heating power of the sun, connected with its powerful radiation on a mountain. The eye-pieces became so hot that they could not be touched, and the black bag was continually getting burnt, and with its smoke irritating the observer's eye.

"Somewhat depending on these untoward accompaniments, which might be much relieved on a future occasion, the definition of the sun was invariably worse than that of every other object in the sky. The year 1856 was, however, so near the minimum of solar spots producing disturbance, that little of importance ever appeared on the disk. The only thing that I would particularise, is the 'silk marking' observed on September 13th.

"This was a feature almost defying any attempts to delineate by hand and eye, but should yield, one would think, to photography. Accordingly, with the assistance of the yacht carpenter, I improvised a photographic box to fasten on the end of the telescope, with a spring trigger, to make an instantaneous opening and closing of the aperture. But success was small, by reason of—1st, the wooden box being often heated to smoking; 2nd, the shaking of the telescope; and 3rd, the rapid vibrations of the air, causing bad definition.

"Making the best of these circumstances, definition was still unprocurable, until by a series of experiments, the very unexpected result was found that the chemical focus of the telescope was ·5 *inch longer* than the usual.

"This circumstance seems to settle the question that the rays which produce the photographic picture are by no means the luminous, and may or may not give us an idea of what we see with the eye. The black photographic effect of bright yellow is well known, and a similar diversity and more in point with regard to the possibility of obtaining good solar photographs was offered to me frequently in Teneriffe—chiefly in the lowlands, when taking photographic landscapes on collodion. It was this: a distant mountain range was seen, with the most perfect definition of innumerable details about its flanks; yet, in the photograph, nothing but the faint, though well defined, outline of the mountain appeared against the sky; as if, in place of the sun shining on the mountain, it were on the other side, and throwing the ridge into the shade. In a word, the aërial effect was intensely exaggerated in the chemical medium, with every increase of distance and illumination. Of the latter, a good instance was shown in the facility with which, at twilight, a good photographic image of the moon was obtained; while, by day, no matter how clear the moon shone out to the eye from the deep blue vault of heaven, no impression whatever could be procured.*

"After meeting with these indubitable instances of the distinction between actinic and optic images, no photograph would be admitted as a decisive evidence on a certain point suggested for inquiry by the Astronomical Society, viz., the brightness of the centre as compared with the borders of the sun. But whether forming the sun's image on a screen, or looking at it direct, there was never the slightest doubt on my mind or my eye as to the centre being very much brighter than the border. The centre was also whiter, the border being yellowish; and it was not at all from this cause that the borders were thought to radiate less light, for the difference was something far greater than variation of colour could explain. This experiment may be, perhaps, taken as conclusive. With the transparent reflector eye-piece of the Pattinson equatorial, the field of view having a stop, with a small perforation of about 3 in. diameter, I found that I could bear perfectly well to look at the border of the sun without any coloured glass; but I could not with impunity allow the stop to pass over the central regions of the solar orb, by reason of their surpassing brightness."

It seems almost superfluous to adduce the fact of the chemical focus of the telescope being half an inch longer than the ordinary focus, as a proof that it is not the luminous rays which produce the photographic picture, as there is, perhaps, no fact in optical science which is, and has been for many years, proved with more certainty than the non-identity of the visual and photogenic rays; and we are surprised to find so good a photographer and physicist as Professor Smyth expressing himself on this point, as if it were a new and hitherto unknown fact. We are quite of the opinion which he states, that a photographic result would not be admitted as decisive evidence on a question of the relative luminous intensities of two parts of the surface of the solar disc. Not only have our own experiments shown us that very great differences of actinic energy may be radiated by surfaces having little perceptible difference; but the laws governing the photographic impression on the sensitive tablet are apparently little in accordance with preconceived ideas on the subject. Setting aside, therefore, the anomalies introduced by the possible variations of colour on different parts of a surface, we can obtain in a photograph of the solar orb any desired difference of intensity between the central and marginal portions of the disc, the former being made to surpass, equal, or fall short of the latter in apparent intensity merely by a variation of the exposure and development. And as there is no means of ascertaining the normal length of time for the continuance of these actions, it is evident that inferences deduced from a photograph, to show any particular variation of luminous intensity, cannot fail to lead to erroneous conclusions.

(To be continued.)

PHOTOGRAPHY AT THE SEAT OF WAR.

[We have been favoured with the following interesting letter from the seat of war by a correspondent who left England for a continental tour shortly before the active commencement of hostilities.]

Casastroso, May 8.

SIR,—Having frequently seen, when in England, letters published in your paper written by photographers in foreign countries, it has occurred to me that you would be glad to receive a letter from a photographer at the seat of war, and I therefore avail myself of this day of rest to write you an account of what I have seen, and a little of what I have done, since I left England.

When I left England my intention was to make a tour with the camera in Switzerland, but the exciting prospect of being able to get plates of battle-fields, sieges, and other

* Further still, it was found that the photographic plate feels and renders at once all those additional rays which in Stokes' spectrum the eye cannot perceive without the assistance of uranium glass.

incidental scenes, induced me to change my course, and, instead of remaining among the glaciers and ice-peaks, to make a journey to the sunny plains of Italy. After mature consideration as to the best way of reaching the scene of action, I decided on purchasing a mule as being likely to be on the whole more economical than hiring one whenever I required its services, especially as there would be a great difficulty in finding such an animal at the seat of war. It took me nearly three days at Martigny to prepare myself for a photographic pilgrimage which I estimated would last three months, during which time there would be very little chance of my being able to remedy any omission I might make at starting. Straps had to be made and fastened on to cases, so as to allow of their being balanced across the mule's back in such a way as to leave me room to ride when I felt disposed, which I have not the heart to do very often, seeing how he is loaded.

I started from Martigny at the end of last month, passed the Great St. Bernard, and, on arriving at Aosta, stayed there for a day to rest. Here I met with an American and a German, both of whom were going to Ivrea, so we decided on travelling together to that place. I need not give you all the details of our journey there, as I did not unpack my apparatus anywhere for the purpose of taking a picture—not because I saw no scene worth taking, but because of the trouble it would involve. On arriving at Ivrea, I found the people in a state of great excitement. The Austrians had been beaten and driven back on two or three occasions by their troops, and they were sanguine that as soon as the French troops were in sufficient force, they and the Sardinians would drive the Austrians before them like a flock of sheep. I heard the most frightful rumours respecting the brutalities of the invaders, and it was not until I approached the district which they had occupied that I began to doubt the truth of these narratives, they were so circumstantially given. I expected to see the burning ruins of houses, fields laid waste, and villages abandoned by the men who had joined the army to revenge the outrages offered to their women, but I saw none of these things. I found the men going quietly to their work all day, and drinking much and talking loudly at the wineshops all the evening. I saw no despairing Lucretias—no smoking ruins, nor, I must add, many haystacks, or anything else in the way of forage. All the horrors I had heard on first entering Piedmont gradually dwindled away, until on reaching the actual place where they were said to have been committed, I could verify scarcely a single instance of violence having been offered by the Austrians, and I took some pains to ascertain the truth. I don't mean to say that no case like that stated with respect to the women took place, but I do say that I could not find anybody who could relate any instance of the kind from his own knowledge; and my inquiries were made at the places where all rumours arrive—viz., at the wineshops. Of the truth of one of the rumours I heard at Ivrea, further inquiry convinced me. I allude to the exactions inflicted on the farmers and tradespeople in districts occupied by the Austrians. The same man who replied to my question, with a laugh, if personal violence such as I have alluded to had been offered, burst into a fit of what I have reason to believe was cursing and swearing, when I asked if they had been robbed to any extent. On several occasions I was shown papers which purported to be receipts for hay, or corn, or tobacco, and signed with some undecipherable German name. Some of the holders seemed to entertain the idea that the Austrian government might pay them some day, but such credulity is not common. I conceive the only use of these receipts to be to prove that the holder supplied *munizione della bocca* to the enemy only in obedience to a requisition.

It took me some days to find out in which direction I could proceed with safety, as I had no desire to fall in with a body of Austrians, although I do not suppose they would have captured me, I being an Englishman and a photographer, which I presume would be a sufficient protection in any civilised country. I availed myself of this delay to prepare a few plates by the Taupenot and Fothergill process, both of which processes I had tried in Switzerland, with very similar results; in fact, the advantages and disadvantages of the two processes seem to me so equally balanced that I cannot decide which to adopt. Even as regarded exposure, which, as you are doubtless aware, is always longer at high altitudes in Switzerland than in England, I found that at one time the Taupenot had the advantage, and at another the Fothergill. I have not had an opportunity of printing from either of the plates yet, and, until I do so, I shall not form a decided opinion on either process. I do not intend to adopt the dry process as a rule, as I am afraid to trust to it in cases where no second attempt to take a negative could be made; moreover, it is too slow to be employed where the exposure must only occupy a short time. In reference to the length of exposure, there is one curious circumstance I must mention. I imagined from the purity of the atmosphere here, and the clear bright sun, that a shorter exposure would be sufficient than would be requisite in England, but I found the contrary to be the case. For example, I coated a plate with some collodion which I had brought with me from England, and with which I had obtained an excellent negative of a Martello tower on the heights near Folkestone, with an exposure of five seconds, although the day was not the most favourable possible, yet under the bright clear sun we have here, I was obliged to expose twelve seconds, and even then the negative was rather under exposed. This is a very important fact to be borne in mind, because, in default of knowing it, an important picture might be spoilt, and there might be no possibility of making a second attempt.

If I wished to obtain photographs of the people here, I should have no difficulty in obtaining sitters, and I think a photographic travelling van, such as you see in England sometimes, would not want for visitors in the more rural parts of this country. Not that either sex is at all remarkable for beauty, but plain looking people enjoy a peculiar faculty for self-admiration.

You cannot conceive what a singular sensation is caused by the consciousness that one is within a few miles of two armies who may at any moment fall upon and butcher each other, for a cause of which nineteen-twentieths of them are profoundly ignorant. The parrot-cry of the liberation of Italy—Italy for the Italians—which is so prevalent among the Italians themselves, is not at all understood by the mass of the French soldiery, if I may judge of the mass by the detachments that have passed through here. They have a vague idea that they are delivering, or are supposed by the Italians themselves to be delivering them, from a grinding tyranny, but they do not appear to have anything like a clear idea of its nature; but the motive which inspires them, and gives them the energy and lightheartedness which they exhibit, is the honour and glory of France, and, of course, Frenchmen. The Austrian soldiery have no such stimulant. They are told to march into a country the inhabitants of which never did them any harm, and to rob and plunder them, and they do it. They can have no desire to kill Sardinians and Frenchmen for the mere sake of compelling the Italians to live under the rule of the Emperor Francis Joseph, still less can they be desirous of shedding their own blood in such a cause. What a satire it is on human nature that the very men who, ten years ago, were in arms to obtain self-government for themselves, are now slaughtering others with the view of forcing upon them the very government which they then fought against. You at home have not a thorough conception of the horrors of warfare, or of the injustice and cruelty it involves. If a man among us chooses to consent to kill or be killed for a mess of pottage, we cannot prevent him, nor is there any great reason perhaps why we should; he voluntarily selects this method of getting his bread, and we are not unwilling that he should take the consequences; but with the people I am among, and, as you are aware, among all the nations of the continent, the case is totally different. A man may have the greatest horror

of shedding blood, but if he is drawn in the conscription, he must serve. The very family in which I am at present living furnishes an instance of the hardship of such a system. There is an old man who is just able to walk behind a cow and a couple of goats to the field where they get a miserable subsistence from the roots of the grass which was cut and sent to Vercelli in obedience to a requisition of the Austrians; there is an old woman who is almost blind, but whose health is otherwise good, and whose appetite is only too keen considering the small quantity of food she can get; and lastly, there is a girl about thirteen—the child of their old age, and who is consequently deficient in both bodily and mental vigour, but possesses that astonishing likeness to her mother which we only observe in cases where the mother is already advanced in years when the child is born. Six months ago these old people were happy and contented. They had spent their lives in labour, and now that they were old they were supported by the produce of their little farm, cultivated by two strong and healthy sons; but the fatal conscription put an end to their happiness; their two sons were both drawn, and the remainder of the family were reduced from modest poverty to a condition of absolute starvation. My coming to live among them has improved their condition a little; for, though I am anything but a rich man, such provisions as are to be had about here are cheap, the Austrian occupation notwithstanding, and it is no great sacrifice to give up a few luxuries now and then when it is to give bread to a starving fellow-creature; but I don't like to think of what may happen to them when I leave, which I must do in the course of a day or two, as it cannot be long before an action will take place between the Austrians and the allies, and painful as it may be, I should not like to miss an opportunity of getting a photograph of a field of battle. In this desire I am not actuated by mere curiosity, though, no doubt, the novelty of exhibiting such a picture at home may have something to do with it, but I should like people to have an illustration before their eyes of what a battle-field is really like, when the excitement of the conflict is past; they might not then perhaps talk so flippantly of war; and endeavour to use their reason in such matters instead of being swayed by their feelings.

I will write you again when I have decided on my future movements. J. L.

THE PHOTOGRAPHIC SOCIETY.

The meetings of the Photographic Society have now terminated for the season, and a long vacation of five months will possibly supply the working members with some interesting matter for the winter session.

We do not estimate very highly the practical advantages to be derived from the discussions at these meetings. As a rule, they are desultory; and, if we are to accept the statement made by most of the principal speakers at the outset of their remarks—that they are made without previous consideration—it is not surprising that they should be so. At present a member is ignorant, until he arrives at the meeting, of the subject to be discussed, so that if anything novel be contained in the papers read, those present can only bring speculation to bear upon it, instead of the result of careful thought and actual experiment; and if these speculations should happen to be erroneous, no subsequent opportunity is offered for correcting them. We have been led to the consideration of this subject from the suggestions made by Mr. Hughes at the last meeting, to the effect that the Council should adopt some means of informing members of the subject to be discussed beforehand, so that they might be better prepared to take part in the discussion.

This suggestion is both practical and practicable. Formerly, when a paper of any importance was to be read at the ensuing meeting, a communication was made to those members of the Society, known to take a special interest in the subject, some days previously, and a proof of the paper transmitted with the communication; the consequence of this was that each of those members came down to the room prepared to point out objections to the theory or process advocated by the writer, and to support those objections by facts, instead of mere speculations.

It may be urged that photographers, whose opinions are of value, ought to have all the facts relating to photography so completely at their fingers' ends, as to be able to speak decidedly on any matter connected with the art without any necessity for previous thought, but such an idea is entirely erroneous.

In the first place, the paper, if it contains no new information—as in truth it very often does not—is not worth reading; and if it does, the remarks must, as a general rule, be mere theoretical speculations; and as these have not unfrequently been shown to be wrong, it has contributed to raise a prejudice against the scientific photographer, who is sneered at by the unscientific one, as not being a practical man; as if the scientific man, who devotes himself to laborious researches in the laboratory, were not pre-eminently a practical man, inasmuch as he employs no substance without making himself thoroughly acquainted with its properties beforehand, which is more than can be said of a vast number of photographers who pride themselves on being essentially practical. On several occasions, during the last few months, the papers read at the Society have contained so little that was useful or interesting that we have hesitated to report them, and, as this is extremely likely to occur again, we trust that greater facilities will be given by the council in future, to enable members to compensate for the want of interest in the papers by an increase of talent in their speeches. If there were any sort of difficulty in the way of accomplishing what Mr. Hughes suggested, or if it involved any great expenditure of the Society's funds we should hesitate to recommend its adoption, but this is not the case; all that is required is a small expenditure of labour and postage stamps, and surely we are not asking too much in desiring that the Secretary should give this information if he does nothing more. In the case of other scientific societies, in whose proceedings we are interested, this is done, and there can be no good reason why the same duty should not be performed by the officials of the Photographic Society.

NEW PRINTING PROCESS.

BY WENTWORTH L. SCOTT, ESQ.

Owing to the number of letters I have had upon the subject of my new printing process, described in vol. ii. p. 26 of the "Photographic News," I think it right to make a few explanatory observations, in accordance with the wishes of many of your readers.

First, the quantity of *starch* employed for the salting solution may vary with the texture of the paper used, and operators must be guided, in a great measure, by their own discretion on this point. Next, the addition of nitrate of lead to the silver bath is not *indispensable*, but it is highly desirable. After the print has been taken out of the pressure frame and soaked in water for a short time, the *brine*, in which it is then placed, should *not* be a saturated solution; and care must be taken that no solid particles of salt come in contact with the print, as they will cause spots and stains to appear during the *toning* process.

From the queries of correspondents, I find that my toning bath formula requires some little explanation. The *chloride of soda*, recommended to be used, is *not* the same as *chloride of sodium* or common salt; the former term—although chemically incorrect—is that which is usually applied to the substance in question. To my surprise, I read, that the *solution of chloride of soda* "cannot be had" in Glasgow and Carlisle. Let those, who find it difficult to procure, take a drachm (60 grains) of good commercial *chloride of lime*, or *bleaching powder*; dissolve it in hot water, and pour off the clear liquid, to which add slowly a

solution of *carbonate of soda*, until it no longer produces a precipitate, or milkiness on dropping into the chloride; a tenth part of the filtered liquid may then be used for each pint of the toning bath.

It should be borne in mind that, although no more of the *chloride of gold* is required to tone prints by this, than by any other method, there *must be* a certain amount of the gold-salt in solution to act satisfactorily. It is, therefore, advisable, when the first vigorous action of the bath seems declining, to stir in a little dilute solution of the chloride of gold (first made *very slightly* alkaline by carbonate of soda) before immersing each batch of prints—the *quantity* to be regulated by the number and character of the photographs. Ordinarily, one grain of the perchloride will tone from 150 to 180 (or even more) square inches of landscape prints. This bath must be kept (chemically) dark, and particles of chloride of silver must be removed by filtration whenever observed. It should always retain a *faint* odour of the chloride of soda, a little of which may be added from time to time.

To avoid waste of material, no more of a photograph than is actually wanted should be placed in the toning bath—the edges, &c., being cut off on its removal from the frame.

Misson, near Bawtry.

Dictionary of Photography.

Dextrine, or British gum, is prepared from starch by heating it to a temperature of 320°, and retaining it at this point for an hour or two. It has now been converted into dextrine. Dextrine is solid and transparent, soluble in water and weak spirit, but insoluble in ether or strong alcohol. It derives its name from a peculiar property which it possesses of producing right-handed rotation upon a ray of polarised light. In solution, it may conveniently replace gum arabic in most cases; thus, it forms a very suitable cement for mounting positives. It is also used in addition to albumen in some of the preservative processes; but its employment in this manner requires care.

Diactinic.—A term applied to bodies which are transparent to the chemical or actinic rays of light, as is rock crystal. It is thus analogous to

Diaphanic, or transparent, which denotes a body having the power of freely transmitting rays of light, and

Diathermic, or transcalescent, a term proposed by M. Melloni to signify a substance which is transparent for heat, like rock salt.

Diaphragm.—Diaphragms are metallic discs, fitted to slide into a certain definite position with regard to the lens, and having circular holes in the centre varying in diameter from ⅛th of an inch to 2 inches or more for large lenses. Their use is to restrict the rays coming from the margin of the field of view, to the *margin* of the lens, and those from the centre of the field of view to the *centre* of the lens; whereby the spherical aberration is diminished, and the difference of focus for near and distant objects at the same time reduced. The above effects are greater with the diminution of the size of the aperture, but at the same time it must be remembered, that the light will be correspondingly reduced; consequently, there is a limit to the diminution of aperture, which cannot be exceeded without the disadvantage of slowness exceeding the advantages of diminished aberration and greater depth of focus. It will be as well for the operator to make himself acquainted with the sizes of apertures best suited for his lenses under the different circumstances in which they are likely to be used, always bearing this in mind, that the *larger* the aperture compatible with distinctness he is able to work with, the more artistic will be the resulting picture.

Dilute.—To weaken by an admixture of water, which renders the liquid less concentrated.

Diffraction.—When a ray of light passes near the edges of a body, it undergoes some remarkable changes. If the light be previously passed through a lens of about an inch in focus, so as to come to a focus, and thence diverge as from a point, the shadows of objects held in the diverging rays will be found to be surrounded with coloured fringes. These can be seen either by receiving them on a screen of white paper, or by examining them by means of an eye-piece. The phenomena of diffraction are among the most beautiful, but, at the same time, the most abstruse in the science of optics.

Diffusion.—A property which is possessed by all gases (and as Professor Graham has since shown by aqueous solutions and other liquids), by virtue of which, if they are left in contact with each other for a certain time, varying from a few hours to as many days, they will gradually mix together; even if the vessels containing them are merely connected together by a narrow glass tube, and the heaviest gas is placed lowest. Oxygen and hydrogen will thus diffuse into each other through a glass tube of more than a yard in length and a quarter of an inch in diameter against the action of gravity, although oxygen is sixteen times heavier than hydrogen.

Dipper.—The piece of glass, or other substance on which the iodised plate is laid, in order to be dipped into the nitrate of silver bath. Dippers are usually made of glass, but there are many reasons why this should not be used; amongst others, being the fragility of the material, and the great adhesion of the two flat and wet surfaces of the plate and dipper when taken out of the bath. A dipper of pure silver wire, as described in a recent number (vol. ii. p. 24), or one similar in shape, but made of iron or copper wire, thickly coated with pure gutta percha, is far preferable to one of glass. Several useful suggestions on this subject having recently appeared in our columns, we need only refer those who seek further information on this subject to our back numbers.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

Before speaking of the modes of manipulating, and the purposes to which the article may be applied in connection with photography, it may be important to notice some of its properties and its behaviour when submitted to different kinds of chemical action.

Gutta percha, as our readers are probably aware, is the gum, or concrete juice, of a tree, growing plentifully in the Malayan forests and in the islands of the Indian Archipelago. It exudes from the tree in the form of a milky fluid, and rapidly coagulates into a hard mass, which only requires mechanical purification to render it fit for the various purposes to which it is to be applied. The pure gutta percha of commerce is of a light reddish brown colour, but the colour of various samples apparently of equal purity will sometimes vary. We have before us at this moment two pieces, each of which have, we believe, been submitted to similar mechanical purification; one, a somewhat rare sample, is nearly white, or, perhaps, more properly of a greyish cream colour; the other is of a dark brown tint, scarcely distinguishable from the rosewood table on which it is laid. The lighter colour, however, would appear to approximate more nearly to absolute purity; as, on evaporating the filtrate from a solution of gutta percha in sulphide of carbon or chloroform, the gum thus purified is nearly white; the tinctorial matter filtered out is probably the result of chops of bark and other vegetable impurities falling into the sap when first collected. Time and exposure have also the effect of darkening the colour.

At ordinary temperatures, gutta percha is a hard, tough, inelastic substance, having a specific gravity of 0·999 at 68° Fahrenheit, different samples slightly varying, however, in this respect in proportion to their degrees of porosity. It is entirely impervious to water, is unaffected by frost, is a bad conductor of heat and electricity, is unaffected by alkalis, vegetable acids, and dilute mineral acids. According to Dr. M'Laghan, its

elementary composition, which is nearly identical with that of caoutchouc, as given by Faraday, stands thus:—

Carbon	86·36
Hydrogen	12·15
Oxygen	1·49
	100

As we have remarked, it is not affected by dilute mineral acids; in a concentrated form, however, it is attacked. By the action of sulphuric acid, with one equivalent of water, it becomes disintegrated with evolution of sulphurous acid. According to M. Payen, in an able article on this substance, in the *Comptes Rendus*, by the action of a saturated solution of hydrochloric acid at 68°, it turns of a darker brown colour, and becomes brittle; this action is, however, it would seem, very slow, as we have seen a carboy which had been used for containing this acid in its commercial form for eight years. Monohydrated nitric acid attacks it violently with effervescence and fumes of hyponitric acid, leaving it red and pasty, and subsequently solid and friable. For vessels intended to contain hydro fluoric acid, it is of great importance, as in a moderately dilute form this acid has no action on gutta percha.

The most perfect solvent for gutta percha is sulphide of carbon, which readily dissolves it without heat. The offensive smell of this article is one objection to its use, and renders chloroform, which is scarcely inferior in solvent power, preferable to the amateur. To some extent when cold, and almost entirely by the aid of heat, it may be dissolved by means of benzol or camphene. Some difference in results seem to have been obtained in experiments with this article under the treatment of ether and alcohol. The usual effect observed is, that it is softened by the application of ether cold, partly dissolved by the aid of heat, but at once thrown down again on the addition of alcohol. Commercial spirits of wine, or even alcohol often sold as absolute, appear to have no effect upon it; but it is stated by Arppe that in absolutely anhydrous alcohol thirteen per cent. of gutta percha will be dissolved, and that it is quite soluble in ether entirely free from alcohol; he adds the curious fact, that if the gutta percha have been previously treated with alcohol it is insoluble in ether. These facts will, doubtless, be of interest to those of our readers who may have failed in obtaining an ethereal solution of gutta percha for experimenting with collodion.

The characteristic which gives to gutta percha its peculiar value in the hands of the amateur in constructive art, is the facility with which it can be rendered plastic, and the ease with which it may then be fashioned to suit almost any purpose. At all temperatures below 100° Fahrenheit, or a little more, it retains its firmness; at 118° it begins to soften, but still retains its toughness and consistency; at about 140° it becomes very ductile and plastic; from this heat to about 200° it is in the best condition for manipulating. Subjected to this heat, or indeed as high as 240°, it retains all its properties unaltered on cooling; but at 248° it melts, and on cooling remains in a semi-fluid adhesive mass, being in fact partly decomposed. At this, and greater heat, it may be incorporated with hypo-sulphites, metallic sulphurets, pigments, and bituminous matter, undergoing, in point of fact, the processes termed "vulcanising," which entirely alter its character, giving it great hardness, and at the same time making it unsuitable for most of the purposes to which it is applicable in connection with photography. Subjected to any heat not greater than 240°, it retains, as we have said, all its properties on cooling, during which process it contracts. This contractile tendency appears to continue to some extent for an indefinite period after cooling, a circumstance of which important advantage can be taken in the formation of joints of various kinds, in which a ligature or coating of gutta percha is applied, and by its continued contraction gives, necessarily, a gradually increased firmness. This contractile tendency should be borne in mind, and allowed for in manipulating, otherwise, in some cases, such as the fitting up of gutta percha tubing, &c., subsequent inconvenience might arise. The same tendency would seem to indicate unfitness for some purposes, such as stoppers, which would gradually become smaller than the orifice to be filled. Of the impurities of gutta percha we shall speak in our next article.

(*To be continued.*)

JACQUES BALMAT, the well-known Alpine guide, who has been quite a lion in a small way since he has been over here, has been presented with a photographic apparatus, &c., by his admirers, and has been duly instructed in its use.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 21*st June*, 1859.

THE following remarks, which I publish here for the first time, will tend to show how photography may become of great service to analytic chemistry. The subject is completely new, and I regret that my numerous occupations will prevent me working it out for some time to come.

Some garnets were once brought to me, and I was begged to pronounce whether they were real stones or imitations; but I was not allowed to submit them to analysis, as they were such extremely fine specimens that the owner would not hear of one of them being destroyed. I arrived at the desired end, however, in the following manner:—Some garnets will scratch quartz, but not all; quartz will scratch easily any artificial garnet. By trying, therefore, the action of a piece of rock-crystal on the specimens alluded to, and then their action upon quartz, I was enabled to affirm that they were real stones.

I have often thought that photography might be applied with success to these sort of determinations. Chemical analysis is becoming more and more perfect every day; the balance, which is yet the basis of every operation, will become less and less used as our *optical* means of observation increase. Already, many difficult analytical investigations have been facilitated considerably by the use of graduated tubes and test liquids, whereby the quantity of any substance is known by noting the space occupied by the liquid, its colour or its transparency being likewise taken into account.

Biot, Bouchardat, Clerget, and others have applied *polarised light* to chemical analysis with great success.

Moigno has written a *brochure*, in which an apparatus of M. Soleil's invention is described; by means of this apparatus the amount of sugar in a solution may be obtained from the action of this substance upon polarised light; and it would be absurd to think that this method could not be applied to other substances besides sugar.

The researches of Melloni, Arago, &c., have shown us with precision the nature of the light that emanates from stars (suns), planets and their satellites, and comets. Arago, by means of his *polariscope*, has been able to distinguish light emanating from a solid from that which is radiated from a liquid or a gaseous body. We may hope, at some later period, to be made acquainted with the physical and chemical constitution of a planet, by means of the light alone which it reflects upon the earth. When we see the solar rays light up the full moon, and give to it the *same tint* that it gives to distant clouds or to far-off mountain-tops upon our own earth, may we not already assert that it is the *same matter* that is acted upon by the sunbeams in one case as in the other?

Photography will, sooner or later, come much to our aid in these respects. Already, as early as 1835, Professor Hessler, of Gratz, began this problem with considerable success. Let us suppose, for instance, that in order to perform some experiment, we have been furnished with a piece of glass, and that it is necessary for us to know whether it be flint-glass or crown-glass; moreover that, for various reasons, we cannot submit it to chemical analysis. If no other means, such as its specific gravity, colour, action upon the spectrum, &c., could be brought to our aid, it would be exceedingly convenient to know that to darken chloride of silver by light which passes through crown glass, it requires one minute and five seconds, and that to obtain the same effect with flint glass it will require two minutes and three seconds.

In 1835 Professor Hessler made some experiments which will doubtless become more interesting as chemistry, optical science, and photography progress. He found that *the action of the solar spectrum upon a paper covered with gum, on which some chloride of silver had been sprinkled, varies ac-*

cording to the substance of which the prism which produces the spectrum is made.

Not only does this action differ with respect to the *quantity* of chloride which is blackened in the experiment, but also as to the precise point of the spectrum at which this action is at its *maximum* for a prism of such or such a nature, and the *time* necessary to obtain the maximum.

The latter element (time), according to M. Hessler, is nul, or nearly so, for water and alcohol; it is from twelve to thirteen minutes for oil of turpentine and oil of cassia; two minutes three seconds for flint glass; one minute five seconds for crown glass.

The maximum of chemical effect was found for the spectrum produced by alcohol to reside in the violet ray in close proximity with the blue; for water, in the middle of the violet; for the oil of cassia, at 23 lines above the border of the violet.

It will be readily understood, from what precedes, that there is a method to be discovered by which different substances may be detected, one from another, by photographic means, *i.e.*, by the action that light exercises upon a photographic paper after having passed through the substances in question. It appears to me that this method would probably solve the difficult problem of detecting sophisticated oils, or of distinguishing readily one oil from another. It might become extremely valuable as a means of analysis in organic chemistry.

I received a visit from M. Nièpce de St. Victor yesterday. He has again plunged into a new series of experiments. Among the new facts he has just discovered concerning the "Action of Light" is the following, which the "Photographic News" will be the first to announce.

If a solution of starch, or dextrine, be submitted to the action of the light of the sun for a certain time (a quarter of an hour for very small quantities), it will be completely converted into glucose, or *grape-sugar*, and the solution will acquire a sweet taste, &c. N. Nièpce tells me he is quite sure of this for dextrine, and almost sure of it for starch. If confirmed, it will constitute one of the most interesting facts discovered by M. Nièpce. Your readers are aware that starch and dextrine are converted into sugar by the action of acids, of ferments, and of heat, but it was never before observed that light alone can produce the same effect. When, however, we reflect upon the influence of light on vegetation, and upon animal life, we wonder less, but we wonder still!

Nothing is more talked of in Paris, at the present moment, than a new system of ventilation and warming of public buildings invented by Dr. Van Hecke, a Belgian physician. The hospitals of Beaujon and Neckar in Paris, and the Asile Impériale of Vesinet in the environs, three of our finest edifices, upon which the government have already expended, but in vain, considerable sums for ventilation, &c., have been submitted to Dr. Van Hecke; the government commissioners having found that, in the course of six or seven years, all the money, formerly so usefully expended, will be regained, from the great economy of Dr. Van Hecke's system, which is, moreover, extremely simple. I remember having read, not long ago, in the *Times* and other papers, accounts of the disastrous effects of bad ventilation—or rather, want of ventilation in the English barracks and hospitals. I was struck with horror! and if the facts had been presented in any other than English papers, I should have felt bound to deny them. For this reason I call attention here to the very satisfactory results obtained in France, Belgium, and Holland, by Dr. Van Hecke. In Paris I have visited, by accident, hospitals ventilated by this gentleman. The effects were rather surprising: each person has, at least, 2,200 cubic feet of pure air at his disposal per hour; this air is warmed in winter and cooled in the heat of summer. The air of the wards filled with sick is as sweet and pure as the breeze of a corn-field, and all this without the slightest draught. The same may be added of other portions of the building we will not mention.

It has been found that a hospital which is not ventilated at all, is considerably more expensive to the government than the same hospital ventilated and warmed by Van Hecke's system. This curious fact is easily accounted for by the quantity of coal consumed in the former case. In one of the many interesting experiments that have been made at Paris, with a view of comparing this new system of ventilation with that of an older one, it was found that in the old system 2 pounds of coal would renew 3,500 cubic feet of air, whilst, in Dr. Van Hecke's experiments, 2 pounds of coal renewed 86,065 cubic feet of air.

MM. Blondel, Labroust, and Dr. Grassi, charged by the French government to examine M. Van Hecke's system, have written a most flattering report, which has been published. They remark, among other advantages it presents, that Van Hecke has succeeded in cooling the air during the heat of summer—"a process often promised, but never before realised in hospitals."

Your space will not permit me to describe the process, but I have called attention to the subject because I believe it to be a most important one; and I think, from what I have seen myself, that the man who introduces this new method of ventilating and warming public buildings into England, will render a service to that country which it would be difficult to repay.

I will add a few words on Van Hecke himself:—He is a short, stout, Dutch-built man, nearly, if not quite, on the wrong side of 50. He took a medical degree in the University of Ghent, while still very young, and went to reside in Brussels as a practitioner. But not liking medicine as a profession, he applied himself to the study of physics and ventilation, to which he has devoted his whole life. He succeeded, after many years of labour, in creating a system of ventilation which, for perfection, simplicity, and economy, has never been equalled. It is a sort of monomania with him; he talks of nothing else, and he has, perhaps, a right to be proud of it. He completely ruined himself and family by physical experiments connected with ventilation made at Brussels, and he arrived in Paris a year or two ago without a sou in the world.

The French, who have a keen eye for anything that is very advantageous to them, caught at Van Hecke's system of ventilation. An order from government arrived one morning at his modest lodgings, and his fortune and reputation were made for ever. He resides now in a nice little *château*, at Asnières on the Seine, and is overwhelmed with demands from Holland, Prussia, Poland, St. Petersburg, &c., besides a large amount of work in France. The Emperor has ordered him to ventilate the Palace of the Tuileries and the Hôtel de Ville.

Van Hecke has been heard to say that he cannot bear travelling (the Dutch are so lazy), but that he has seen the whole of Europe in less than two years, on account of his new system of ventilation! This reminds me of an anecdote of Donizetti, the celebrated composer. One evening, while conducting the orchestra at the French opera for the performance of one of his *chefs-d'œuvre*, a violinist inquired suddenly of the maestro—"Is it really true, Signor Donizetti, that Rossini composed the 3rd act of the "Barber of Seville" in four-and-twenty hours?"

"It's very possible," replied the composer, shrugging his shoulders, "Rossini is *so very* lazy, you know."

Every one knows what a dreadful thing it is to cut one's finger while dissecting. I lost a friend not long ago from this very accident. To-day I read in an Italian paper (*Annali di Chimica, &c.*), that during the year 1836, Dr. Nonat tried upon himself the effects of a *solution of chlorine*, after a wound from a dissecting knife. He had been examining the body of a woman who had died from puerperal fever, when he suddenly remarked a quantity of red streaks on his left hand, proceeding from a slight scratch, and spreading all up the arm. He immediately returned home, and plunged his hand and arm in chlorine water. This bath was renewed several times. The experiment succeeded

perfectly, and saved Dr. Nonat's life. It was afterwards repeated by one of his pupils, with equal success; and, later still, by Dr. Garrigou. This gentleman says that chlorine water has many times preserved him from severe accidents, probably from death.

Chlorine water should, then, be kept in large quantities in the dissecting rooms of medical schools, &c. It is easily obtained by saturating pure water with chlorine gas, procured by the action of hydrochloric acid in peroxide of manganese. It must be kept in the dark, for by the action of daylight it is slowly decomposed, and forms a new hydrochloric acid with the hydrogen of the water.

Up to the present time it has been believed, and is constantly asserted in medical papers, that no remedy has been discovered to save the life of a person who accidentally wounds himself with a dissecting knife.

Vogel, the celebrated chemist of Munich, has just made known a very pretty experiment, by which oxalic acid is produced from coal gas. It is known that alcohol can be transformed into oxalic acid by the oxidising action of nitric acid. The researches of Berthelot, Robiquet, and others have proved that alcohol can be obtained from coal gas (bicarburetted hydrogen, $C_4 H_4$, sometimes called olefiant gas). It was, therefore, reasonable to suppose that oxalic acid might be formed by means of this gas. Vogel has just proved the fact by passing a current of bicarburetted hydrogen through nitric acid of a sp. gr.=1·39. The current was kept up for some days. In a short time the nitric acid became yellow, and deposited a sort of resin; shortly afterwards crystals of oxalic acid were deposited, as expected.

THE COLLODIO-ALBUMEN v. THE FOTHERGILL PROCESS.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—Such diverse opinions having been expressed on the subject of the respective merits of the collodio-albumen and the Fothergill processes by some of the most experienced photographers, I was induced before leaving London to prepare some plates by both processes with the view of ascertaining for myself, if possible, which worked best. For the last three weeks I have been engaged in taking occasional pictures in different parts of the Isle of Thanet, with plates prepared in the manner above-mentioned, and I have great pleasure in forwarding you the result of my comparison, together with some few facts that I think may interest your readers, and may, moreover, induce some of them, who have not yet decided where to go, to visit a place which is as interesting in historical associations as any part of England, and is by no means the flat and unpicturesque country that it is generally supposed to be. I have already some of the prettiest pictures I have ever seen, and in my opinion much superior for the stereoscope to those of the greater portion of the scenes which form the staple of stereoscopic pictures, and I flatter myself that I should not have succeeded better if I had gone to the expense of a trip to the Lakes.

My first comparative experiment was made on the 25th of last month. The object I selected for the experiment was a group of three cottages, the front of the building in the foreground being covered with clematis, and with a few trees surrounding them. The gardens were divided by lumps of chalk heaped up, on which the sun's rays fell rather strongly. I exposed first with the collodio-albumen plate for one minute and a half, and subsequently with a Fothergill plate for the same length of time; merely moving the camera a few yards so as to get a picture slightly different from the first, but taking care that the objects represented in the camera should receive the same amount of illumination as in the first picture. I then put this camera in the cart, and took out a stereoscopic one, with a double lens. This I planted so as to have the objects I wished to reproduce in shadow, and again exposed a plate prepared by the collodio-albumen process, and a second by the Fothergill process, each for two minutes. In this case I made no change in the position of the camera, so that I may say they were taken under precisely identical circumstances.

On reaching the house where I was staying, I only waited until it was dark before proceeding to the development of my negatives. For the collodio-albumen process I used the developing solution, the formula of which is given by Mr. Sidebotham in a recent number of the "PHOTOGRAPHIC NEWS," vol. i., p. 170, only substituting gallic acid for the pyrogallic. For some time no trace of a picture was visible, but at last it began to give evidence of its presence. First, the sky came out, and then a bit of the picture here and there, but so very slowly that I became impatient, and added a couple of drops of weak solution of pyrogallic acid to the developing solution. This stimulant quickened the progress of the operation, which I assisted still further by the addition of two drops of the nitrate of silver solution. The resulting negative is a moderately good one, though, if anything, rather under exposed. To develop the Fothergill plate, I used the solution mixed in the proportions given in Mr. A. Keene's formula, with a very slight accidental modification. The development in this case was much more rapid, and the details of the negative came out fuller and stronger. Its general appearance showed that the action of the light upon it had been more vigorous, but, notwithstanding, I am not prepared to say that it will give a better print than the other. On this point, however, I can only give you positive information after I return home.

I next proceeded to develop the stereoscopic plates, which I did simultaneously. In this case also the Fothergill plate was acted upon by the developing solution with much greater rapidity than that prepared by the Taupenot process; and I had fixed and washed the former before the latter was fully developed. The character of the resulting negatives was about equal in this instance also; there is perhaps a shade more density in the collodio-albumen negative, but this is so trifling as to be almost imperceptible even on a close examination.

I tried a similar experiment in taking a negative of the ruins at Richborough, formerly a Roman castle, and the remains of which are of sufficient magnitude to render a visit to them interesting. The walls are said to be twelve feet thick at the base, are of considerable height and wonderful solidity, and have a very picturesque appearance.

I am disposed to think that the best negative I have is one taken by Fothergill's process; and, vexatiously enough, the object is precisely the one about which I care least—it is simply that of an old stone gateway at Sandwich. I may remark of this old place that there are some very pretty pictures for the stereoscope to be had about it; and probably a view of Tenterden Church and steeple would be considered doubly interesting, not only from its making a picture, but from the associations connected with the good Sir Thomas More. Most of your readers are probably aware that all the ports and havens on this portion of the coast have a great tendency to silt up, several of the places formerly on the sea shore being now removed some distance inland. "In the days of Henry VIII.," says Sir Thomas More—I am speaking on the authority of a book lying on the table in the coffee-room—"divers men of worship assembled old men of the country to commune and devise about the amendment of Sandwich Haven. At which time as they began first to ensearch by reason, and by the report of old men thereabout, what thing had been the occasion that so good a haven was in so few years so sore decayed, and such sands risen, and such shallow flats made therewith, that right small vessels had now much work to come in at divers tides, where great ships were within a few years past accustomed to ride without difficulty; and some laying the fault to Goodwin Sands, some to the land inned by divers owners in the Isle of Thanet, out of the channel in which the sea was wont to compass the isle, and bring the vessels round about that, whose course at the end was wont to scour the haven, which, now the sea excluded

thence for the lack of such course and scouring, is choked up with sand. As they thus alleged, divers men, divers causes, there started up one good old farmer, and said, 'My masters, ye may say every man what he will. I have marked this matter as well as some others, and I wot how it waxed right well enough. For I knew the haven good, I have marked, and so have I seen when it began to wax worse!' 'And what hath hurt it, good father?' quoth these gentlemen. 'By my faith, masters,' quoth he, 'yonder same Tenterden steeple, and nothing else!' 'Why hath the steeple hurt the haven, good father?' quoth they. 'Nay, by Our Lady, masters,' quoth he, 'I cannot tell you well why, but I wot well it hath, for, I knew that a good haven till the steeple was builded, and, by the Mary mass, I have marked it well and it never throve since!'" This is rather a long extract, but it is amusing, and may explain to many of your readers the meaning of the frequent allusion to Tenterden steeple, which occur in arguments relating to cause and effect. A person sitting near me says, that it was a clergyman of this church who once said, when speaking of the depravity of the age, "That little children who could neither speak nor walk were to be seen running about the streets cursing and swearing."

To return to my experiments, besides those enumerated above, I made several others under circumstances calculated to test the merits of the respective processes and to show any difference in the working qualities of the plates so prepared, but my experience will not as yet enable me to assign a superiority to one over the other. However, now that the weather appears to be getting more favourable for out-door operations, I propose to continue my experiments in this part, and, if you publish this letter, I shall be happy to write you again.

Have any of your readers tried Monkhoven's cellulose process in the manufacture of collodion?—I am, sir, your obedient servant, E. B.

Photographic Societies.

AMERICAN PHOTOGRAPHICAL SOCIETY.—FOURTH MEETING. —*March 9th*, 1859.—DR. DRAPER, President, in the chair.

THE Secretary was instructed to make up the record of the Society from its beginning, and present the report in full at the next meeting.

After the reading of the papers, Mr. SEELY made an oral communication, of which the following is a synopsis: It has recently been shown that an undeveloped negative is capable of development after fixing. It therefore appears that the presence of iodide of silver is not necessary during development, and that the retaining film is somehow changed. I take it for granted that no iodide of silver or metallic silver can be present to serve as a nucleus for development when none can be detected by the microscope in practised hands. It seems probable that the effect of light on the iodide of silver is only molecular, and that the effect is communicated to the film, which of itself is insensitive to light. The iodide of silver and the sympathetic film are chemically unchanged from the beginning to the end. Their action in development is catalytic.

Under the order of discussion of papers read—

Mr. RUTHERFORD said a good dry process is the great desideratum. We cannot carry our dark room and a convenient supply of water on an excursion; the thought, or sight of cumbersome apparatus and tents is unpleasant to those who dislike trouble and to work hard for amusement. A dry process need not be so quick, but it is essential that it shall be simple and certain. Albumen results are good enough, but the process is too troublesome. It is proper for this Society to make the subject of a dry process a conspicuous problem, and to encourage attempts at its solution. Mr. Rutherford concluded his remarks by moving that a prize of one hundred dollars be offered in the name of the Society for the best dry process offered for competition during the next few months.

After some discussion the subject was referred to the board of directors.

Mr. BOYLE made some remarks on the colours of clouds and mists, especially with reference to the art of painting.

Mr. SEELY, in commending the paper read by Dr. H. Draper,* observed, that the intensity of blackness, as shown by the specimens exhibited, was greater than that produced by the chloride of gold, or mercury, or the sulphides. If so, the chloride of palladium would soon come into use as a toning agent for transparent positives on glass. The photographic uses of the rarer metals should be studied. No doubt, valuable qualities are to be found in substances not yet thought of. The metal uranium has recently come into quite extensive use in Europe. Mr. Burnet is entitled to most of the credit given to Nièpce de St. Victor, for the discovery of the properties of nitrate of uranium. The salts of uranium has excited little attention in America, for the reason that it was shown at an early day, that iron salts were possessed of the same properties, and could be substituted in all the uranium processes.

Dr. DECK: There is difficulty in procuring palladium, especially of the desirable purity; it is not a commercial article and but little is produced. It has been used by dentists, and for the beams of balances. It costs about seven dollars per oz.

The PRESIDENT: I have found the chloride of palladium very useful in producing photographs of microscopic objects.

In answer to a question, Dr. H. Draper said that he had not observed that the chloride of palladium produced varieties of tint, as obtained with chloride of gold and sulphides. It acted very promptly, and gave only shades of blackness.

Dr. VANDERWEYDE described some of the ordinary methods of strengthening. He preferred a process in which iodine was used, as the thin iodide of silver negative was quite intense towards the chemical rays.

Mr. SEELY: I understand that at a recent meeting of the Farmers' Club, the opinion was emphatically expressed that the moon has no influence on vegetation, and that the notion which some farmers have, that the moon should be consulted for the time of planting, was treated as unworthy of attention. I am not prepared to say what specific or observable action the moon might be expected to have on the growth or health of animals or plants; yet I do not think it improper to propose the question in this society. The physical action of the moon by virtue of gravitation, in producing tides in the seas and the air, is everywhere felt. May there not be a perceptible chemical action on the earth from the moon's rays? Mr. Rutherford gets a photographic impression of the moon in a few seconds. Are there undiscovered chemical peculiarities in moonlight? May there not be plants of such a delicate nature that they protect themselves from sunlight, come out by night, and thrive by the light of the moon? There are many animals like the owl, that are wakeful only at night; the moon to such is what the sun is to us. I wish only to have it understood that some of those questions about the moon's influence, treated with so much contempt by scientific men, may yet be fairly asked again.

The PRESIDENT: Ten years since Mr. Hunt made experiments on the effect of light on the growth of plants, and came to the conclusion that the indigo ray favoured the germination of seeds, while the yellow rays retarded it. After the plant has appeared above the surface of the ground, the illuminating or yellow rays, are essential to its healthy growth, enabling it to decompose carbonic acid, and to appropriate the carbon. In ripening, or producing seeds, the red rays are essential. Dr. Gardner has exhibited some very curious experiments to show that it is the indigo ray which determines the growth or turning of the plant towards light. Turnip seeds were planted in a box, which was kept in the dark; at the end of forty-eight hours the plants had come up wiry and thin, of a sickly yellow hue, and standing erect and straight. The box being now placed in the solar spectrum, all the shoots soon turned towards the indigo ray. The plants might even be made to grow downward. Moonlight in its degree, acts like sunlight; sunlight is 200,000 times more intense. (In answer to a question.) The maximum of chemical power is found in the indigo, and not in the violet, as stated by some. The common crocus is a plant which is remarkably sensitive to light; cover it with your hat and the leaves fold up, let the light fall on it again, and they open so rapidly that you may see them move.

* Reported in the last number of the "PHOTOGRAPHIC NEWS," No. 41 p. 178.

DR. DECK: It is well known that tadpoles kept in the dark do not change to frogs, but continue to grow as tadpoles till they become monsters in size. On the contrary, if, while young, they are exposed to an excess of light, I suppose they will become frogs prematurely. The stories of showers of frogs are often ranked with stories of sea-serpents and mermaids, but I have witnessed a veritable frog shower, when hundreds of bushels came down. The frogs were none of them alive, and were remarkably small. I suppose the frog spawn was carried up by a water-spout, and under the influence of the light and air, the tadpoles were prematurely changed to frogs.

MR. TILLMAN: At an exhibition of fireworks in commemoration of the completion of the Ridgwood Water-works, a very curious and novel effect of coloured light was produced. As the director of the display is a member of the Society, we may expect some account of it at our next meeting. The art of pyrotechny is fairly within the scope of our discussions. What is the best procession of colours to produce the highest effect? How best to combine poetry of colours and dramatic action? Who can foretell the effects which will hereafter be produced by overtures of variegated lights?

At this point a very entertaining discussion ensued on the turning of the sunflower towards the light. Although many of the members engaged in it, the subject elicited more wit and poetry than scientific truth. It was a refreshing episode.

A gentleman in the audience, and not a member of the Society, occupied a considerable time in endeavouring to convince the Society that he had perfected a valuable and wonderful process of transferring ambrotypes to paper.

MR. TILLMAN: Will the gentleman communicate some details of his invention to the Society, or exhibit specimens?

The GENTLEMAN: The process has cost me a great deal of money, time, and study; I do not propose to give it away.

MR. SEELY: Whether an inventor shall give his ideas to the public, or sell them, is a question for himself to settle. We cannot blame him for the decision he makes. In the Society we publish discoveries; we must not make it a market place. Let this be the occasion for determining our course for the future, so that there shall be no misunderstanding.

The subject elicited considerable feeling all in the same direction, and, after remarks by various members, the sentiment of the Society was expressed by the unanimous adoption of the following resolution presented by Mr. Stetson:—

Resolved—That this Society desires and expects that in every instance where either members or guests claim to be in possession of improvements, either the new results or the details of the invention, or both, be given to the meeting.

Adjourned to the second Monday in June.

Photographic Notes and Queries.

THE LINSEED DRY PROCESS.

SIR,—I beg to reply to the questions of your correspondent "Warrengal," vol ii. p. 180, and at the same time to state my reasons for employing linseed as a preservative for collodion. I have long felt assured, from numerous experiments, that atmospheric action exerts a far greater amount of influence on sensitised collodion than we are, at present, aware of; and, therefore, that the following requisites are absolutely necessary for the preservation, and subsequent development, of a collodion plate. 1st. Some agent that will perfectly exclude the sensitive film from all contact with the atmosphere, and be at the same time moderately elastic, and perfectly transparent. 2nd. That it shall exert no chemical action whatever, or be liable to be acted upon by the nitrate of silver, or other products in combination with it. 3rd. That it shall be such as to be readily dissolved, so as to leave the film in precisely the same condition as it was previous to its application, in order that the development may be proceeded with, uninfluenced by any intervening substance. These desiderata being gained, a prepared plate may undoubtedly retain its photogenic powers for an indefinite period. I found, by using linseed mucilage, that the first and last of these requisites were certainly attained, and I believe the second also, but on this point I have not chemical knowledge sufficient to speak decidedly, and can only say that I find it practically correct.

With regard to the length of time the plates prepared according to my plan will keep, I can only speak with certainty as to three weeks, having never had occasion to preserve them longer; but I have found no alteration whatever at that period. I have now, however, prepared, as a fair test, 24 plates, one of which I shall use every fortnight, and I am quite sanguine that I shall find the last equally as sensitive as the first. The exposure for stereoscopic pictures with my lens, on a good day, is one minute to one-and-a-half minutes, but this, of course, varies greatly according to lens, subject, climate, &c. The first is equally good, and, perhaps, easier to use. The mucilage should not be too strong; I find it gives the best results when it will run through fine muslin in one continuous stream; it is also preferable to wash the plate by immersion, a stream being apt to free the nitrate irregularly from the collodion. I must apologise for this long letter, but I should wish any gentleman who feels inclined to try the linseed to be cognisant of my reasons for adopting it. . . . .

W. W. HUGHES.

Nantua (Ain), France.

[We thank our correspondent for the valuable information on the above subject, and shall be pleased to receive the account of the tour mentioned in the latter part of his letter. If he will favour us with it, we do not doubt it will prove of great interest at this season of the year.—ED.]

THE OXYMEL PROCESS.

SIR,—In answer to "Philoxymel" (vol. ii. p. 167), I fancy the pin-holes that he complains of arise from the sulphur that the honey contains, which is acquired in the destruction of the bees.

I tried the oxymel process for some time, and not being able to work it satisfactorily, I made a modification of the above process, and which appeared in the pages of one of your contemporaries.

In place of honey, I use a preservative solution as follows:—

Best white sugar	2 ounces.
Distilled water	2 ounces.
Glacial acetic acid	1 drachm.

Dissolve and filter.

When the plate is excited, wash with a small quantity of water until the greasy appearance is gone; drain partially, then pour on the preservative solution from a wide-mouthed cup, giving it three coatings, and delaying each operation or coating one minute; then stand aside, to drain on blotting paper.

After exposure, which in this process is very short, if properly prepared, develop with—

Pyrogallic acid	2 grains.
Citric acid	1 grain.
Alcohol	1 drachm.
Water	1 ounce.

To which a few drops of the nitrate bath must be added before development.

After the exposure and before development, it is as well to soak the plates in the following solution, to remove the preservative solution:—

Alcohol	1 ounce.
Water	10 ounces.

Any negative collodion will do, but it is advisable to have an old one, and one prepared for dry processes.

Littleboro'. A. WHITHAM.

SPLITTING OFF OF THE FILM.

SIR,—In answer to one of your Minor Queries, "Splitting off of the Film," in vol. ii., p. 132, you will perhaps permit me to make a few remarks, which, if you consider them of

use to "Verger," or any other of your numerous readers, are quite at your service. For some months past I have been in the habit, in landscape photography, of developing with iron, clearing off the iodide with cyanide, and, after well washing, pouring over the plate one part of pure glycerine, and three parts of rain water, and subsequently strengthening with pyrogallic, acetic acid, and nitrate of silver. The advantages of this method are fourfold—1st. It enables you to keep a plate perfectly moist for a week, or longer if you wish it. 2ndly. The glycerine has the singular property of preventing that untoward accident of the film peeling off—under the pyrogallic or iron developer and abundant washing. 3rdly. It saves an immense amount of time in the field, as the operation of strengthening can be much better performed at home; and, 4thly. The requisite amount of water is considerably lessened—no trifling consideration on most occasions. My plate box is also varnished with shell-lac inside and out, and is perfectly waterproof.

A professional of considerable experience in this neighbourhood has followed my example, and so satisfied is he with its simplicity and success, that he now always leaves the hypo. behind. In portraiture I also use an iron developer; I adopt the same plan, coating each plate with glycerine when finished, placing the plate on a shelf, and strengthening afterwards, as opportunity serves. Before strengthening I wash off the glycerine under a tap; but sometimes, and successfully, add a fresh portion of glycerine to the developer.

I was first induced to use glycerine from its known property of retaining moisture. I inclose my card, and a stereogram developed and strengthened as above.

M. D., Oxon. R. M. S.

DRY COLLODION PROCESS, WITH RESIN.

SIR,—Mr. Hardwich speaks, in the last edition of his Photographic Chemistry, p. 374, of a dry process by the Abbé Despratz, which, if good, is certainly very simple and easy; it is merely adding white resin to iodised collodion, and then treating it nearly as for the wet process. Mr. Hardwich does not tell the proportion of resin used by Despratz.

I have been experimenting on it for some days back—beginning with ten grains of resin to the ounce, and finally coming down to two grains. I find it very sensitive—about 45 seconds—but it is very capricious in the results, curtains and feathers, and such like, springing up without any assignable cause. Still, as it promises well, I should wish for further information.

When I used ten grains of resin to the ounce of collodion, I found, on removing the plate from the dark frame, a beautiful *white* picture, impressed on a grey ground.

M. M. D.

THE COLLODIO-ALBUMEN PROCESS.

A valued correspondent has asked us to inquire if any of our readers have made experiments, or observed any facts, which would tend to throw light on the cause of dry plates deteriorating by being kept. If we could once get at the chemical change which takes place, we might hope then to arrive at a preventive, and, perhaps, eventually discover a method of restoring over-kept plates.—ED.

ANSWERS TO MINOR QUERIES.

TEST FOR GOOD GUN COTTON.—*M. O. R.* After the gun-cotton is dissolved in the alcohol and ether to the requisite thickness, pour a small quantity of the plain collodion on a piece of glass, allowing it to drain off in the same manner as in coating the plate with iodised collodion. If the glass appears perfectly clear and transparent after it is dried, and viewed by transmitted light, the gun-cotton may be used for photographic purposes; but if there should appear any milkiness or opacity on the surface of the glass, there is most likely a fault in the gun-cotton. Unless a perfectly clear and transparent film is obtained, the collodion properly sensitised will not furnish good results.

DETECTION OF FREE IODINE IN SOLUTIONS.—*Polyphemus.* Your red collodion does contain free iodine, although you have failed to detect it by the starch test in the ordinary way. The characteristic purple coloration fails to show itself if starch be merely put into collodion, or similar ethereal liquid containing iodine—water being necessary for the reaction. If you pour a few drops of the collodion under examination on to a piece of the crumb of bread (which contains starch), and then, when the spirit has evaporated, moisten it with water, the smallest trace of free iodine present will be shown by the production of a purple stain.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

NEAL FLAHERTY.—The crystal inclosed is bichromate of potassa, not prussiate of potassa, as you imagine. It is used in photography; and its properties have, on more than one occasion, been described in the "PHOTOGRAPHIC NEWS."

J. F. (Exeter).—Either the process of re-development after fixing and well washing, or darkening by means of bichloride of palladium, as described in our last number by Professor Draper (though we have not tried this latter process), would, we think, be preferable to the one you are at present adopting.

W. L. C.—1. Yes; it must be saturated with iodide. 2. We think the plates would be better, if not more than two or three hours were allowed to elapse between the exposure to the vapour of iodine and the sensitising. 3. The exposure to the vapour of iodine may be done in the light, but the sensitising must, of course, be done in the dark. 4. Several days. 5. Several days also. 6. Develop, wash, fix, wash, and dry. 7. We cannot answer this; we think experience in the process is the chief thing wanted. 8. A dozen or two collodio-albumen plates can be prepared in an hour or so, by arranging so that the operations follow each other in proper order; but it will not do to first coat with collodion, and then leave the sensitising till the next day. Follow some of the articles which we have already published on the subject; or, if preferable, pick out something of each and make a process that way.

W. R. (Eton).—One question has been answered by post, the other is not in our power to answer.

JEAN G.—Received.

R. M. S.—Your second letter has not arrived in time to prevent the insertion of the former one. We do not think the valuable facts contained in it are known, and should have been sorry if any remarks of a contemporary had prevented your benefiting our fellow labourers in the art.

M. N.—1. Your collodion is not good; use a colourless one prepared with cadmium. 2. Use Davanne and Jonet's developer, as described in a recent number. 3. We do not like alcoholic collodion at all.

N. TAYLOR.—We think you will have to get them made to order. A large specimen is now in preparation.

R. GORDON.—Place a mat on the picture, and mark the shape required with a pencil, and then cut it out with a sharp pair of scissors. You must try and find out such very simple points of manipulation for yourself: we could not describe them intelligibly in print.

X. Y. Z.—1. Perhaps, as you suggest, your pyrogallic acid has deteriorated by keeping. We hardly know which to prefer; both Mr. Lyte's and Θ's are very good processes.

T. A.—We will give your letters further attention.

PAPER.—The spot is caused by the stream of developing solution being poured on at one spot, washing away the nitrate of silver from that portion of the sensitive film, and so preventing the proper action of the solution. Pour it on gently along one edge of the plate, and the fault will not occur.

AMATEUR.—1. Your only remedy is to paint, or otherwise stop out the sky, as described in former numbers. 2. The preparation of oxygen gas is not dangerous in the hands of a person at all acquainted with chemical manipulations, but, like all other similar operations, it requires care.

WEST BROMPTON.—Your picture could not have been sufficiently washed after it was fixed, or it would never have faded in the manner you state. It should not have been put into the box wet, as if there were any tendency to fade, that would be sure to hasten it.

BATH.—Your bath has unquestionably suffered by the treatment it has undergone, but whether or no it be unfit to use for exciting some Fothergill plates, is a question which only experiment can decide.

BOX.—We think that you ought not to expose so long as 15 seconds for a portrait with a good light and lens; although much would doubtless depend upon the exact meaning of the term good.

L. S. T.—The use of the stop in a lens is to confine the action of the middle of the lens to the middle of the picture, and that of the side of the lens to the side of the picture; and, therefore, if the size of the lens and distance of the stop are not duly proportioned to each other, the picture will suffer.

Communications declined, with thanks:—Delta.—F. O.—A Juryman.—X. Y. Z.—An Old Card.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—A. J. O. P.—L. E. T.—Hypo.—P. R. O.—Key.—A Very Young Tyro.

IN TYPE:—Reticulus.—J. Walter.—Ponçon.—M. M. D.—N. O.—G. S.—H. T. T.—William Beyer.—T. H. S.—A Subscriber.—G. H. W.—Vistor.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁎ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II, No. 43.—*July* 1, 1859.

THE TENERIFFE ASTRONOMICAL EXPERIMENT OF 1856.

CONCLUDING NOTICE.

BY far the most interesting and important to photographers of all the valuable facts observed during the short time of the expedition, are the observations on the lines in the solar spectrum. These were made with as much care as the importance of the case deserved, and the results obtained seem to show, almost conclusively, that some at least of these curious halts and stoppages in the uniform progression of the wave length, and perfect blending of the spectrum colours into each other, are due to the absorptive action of the earth's atmosphere. The observations under this section are so interesting, that we are induced to quote them as fully as we are enabled in the absence of the beautiful maps of the lines with which the volume before us is illustrated.

"Towards observing the black lines of the solar spectrum, we had a speculum to reflect sunlight, kindly furnished by Mr. J. Nasmyth, C.E.; and an apparatus, consisting of a prism, a fine adjustable slit, placed in the focus of a 2-inch object glass, and a telescope of the same size, with magnifying powers as high as 30, prepared for, and lent to us by, Mr. Airy. There was no angular measurement contemplated; only eye observation and comparison of differences, between the spectrum seen and that engraved by Fraunhofer. To employ these instruments on Guajara, a small chamber, some 10 feet square, was built of rude stone, roofed in with planks and old canvas, and further covered with a quantity of '*retama*' branches, to keep out every particle of the sun's light, while a square tube of wood, 5 feet long, with a moderate aperture at the end, was thrust through the wall in the direction of the speculum mounted on a small stone pier outside. In this manner, a considerable degree of darkness was secured, even when the sun's rays were being reflected into the instrument.

"A cursory examination of the spectrum showed much general correspondence with Fraunhofer's view as to the principal lines; but so great a discordance, as to detail, that I thought it better to proceed on an entirely independent footing, and make angular drawings of what I saw; and, when well satisfied with them, to compare them with the engraving. One evening, trying the sun unusually low, and finding new features worth following up further than could be done while using the reflected ray from the speculum, I took the prism apparatus out into the open air, and, by means of a theodolite stand and photographic black bag, was enabled to continue the observations until the sun set at the usual mountain zenith distance of 91° 11′. These direct observations of the sun were repeated on many occasions with the sun, both west and east. The lunar spectrum and that of the blue sky were also similarly examined.

"So far for the Guajara experiences. At Alta Vista a similar optical dark room was prepared, but profiting by hints procured from the direct line instrument at low altitudes, I tried it on the sun at midday in the same manner, when an immense increase in the number and definition of the black lines at the violet end took place. With the reflected ray, the two bars of H could but just be discerned as faint nebulous streaks, B, C, and D, being as sharp and as black as silver wires in a telescope; with the direct ray, the individual lines composing the bars of H could be distinctly separated, and many lines appeared indistinctly in the space beyond. The conclusion thence to be derived was, unfortunately, that our particular speculum did not reflect the violet end of the spectrum; and our observations were, therefore, not comparable in that part, even if they were in others, with standard observations elsewhere. The discovery was made too late to enable a *direct* determination to be made for Guajara, but the method was employed for Orotava, when we returned there from the mountain a few days after."

In a table appended to the report, Professor Smyth gives copies of the whole of the drawings of the red end of the spectra, that were taken at the three stations, on the same scale as Fraunhofer's justly celebrated Munich engraving. From a comparative examination of these, the following conclusions are deduced:—

"Bearing in mind that great accuracy of position is not pretended, and that, though much care was bestowed on the general appearance, thickness, and definition of the lines, the shortness of the time available was entirely inadequate to procuring a good drawing, and that several of the diagrams should be employed together in deducing a result, we may now proceed to the examination. Comparing the eleven Teneriffe spectrums of the sun with Fraunhofer's, we can only assume identity in place of the lines A, *a*, B, C, D, E, and *b*: everything else appears differently. Of this difference the prevailing feature appears to be, that whereas Fraunhofer's spectrum stretches to beyond A, which is seen by him as a clear and distinct line; he gives none of the numerous broad bands and groups of lines between A and *a*, and *a* and B that were visible on the mountain, and below whenever A was quite or nearly visible.

"From the fact of Fraunhofer's spectrum including A, we might be entitled to expect from the Teneriffe observations that it represents the sunset appearance; but, then, how can the omission of the broad bands of lines between A and B, and C and D, and especially those beyond D, be explained? If, on the contrary, the absence of those marked bands is to be regarded as a proof that a high spectrum was intended, my own spectra indicate that A should not be seen in such a position. Again, while the spaces between A *a* and *a* B are blank in Fraunhofer's and well filled in Teneriffe, he has some lines between B and C, a compartment always remarkably empty with us. . . . . . . A zenith spectrum, then, at that height (8,903 feet), and with the particular apparatus employed, would appear to begin between *a* and B; and, excepting the lines C and D, to have nothing noticeable between B and E. A horizontal spectrum, on the other hand, station and instrument remaining the same, begins outside A, has numerous powerful bands of lines between A and B, but none between B and C; and, while C has not increased in thickness, B has more than quadrupled its size, maintaining full sharpness and definition. Again, a certain excessively fine line, at the distance of B to C, beyond C, has grown to many times the thickness of the latter, and is accompanied by a broad and marked band of finer lines. A more extensive increase still is perceived in the innumerable lines between C and D, and immediately beyond D. Of these variations from a zenith spectrum, as observed phenomena, there is no doubt; for the series of drawings taken quite independently are found, on being now brought together, to confirm each other in the result of the growth of

these lines with the zenith distance. The observations of August 9 are the most important to this end; there were three drawings obtained the same evening, and the lines grew visibly under my eyes, the red end apparently lengthened out from B to A; additional lines were seen every succeeding moment, and the old ones became better defined, causing nebulous bands at 85° zenith distance to become groups of fine black lines at 91° zenith distance. Looking at the same time to the notes of colour, the red *seems* continually to have grown to the final exclusion at 91° zenith distance, of yellow as a pure colour, orange merging at once into green. . . .

"Professor Stokes, indeed, suggests that the deficiency of the red end of my high mountain spectra may be due to the more luminous rays extinguishing the faint red; and that, if the former had been absorbed by a cobalt-blue glass, or the extreme red separated by refraction through a second prism, A might have been seen; just as, in fact, it was seen with the low-sun spectra, when the atmosphere acted the part of a suitable absorbing medium; and the suggestion is of extreme value for future experiments, though it is proper to state that, on Teneriffe, the magnifying power employed was such as necessarily to throw the brightest part of the spectrum out of the field of view, when the extreme red was under examination."

Some differences were also observed in the spectrum of the light from illuminated portions of the sky. We thus find it stated that, "taking together the whole of the sky spectrums, and comparing them with those of the sun, we find that C is not marked in circumstances where it might be expected; and when it does appear, it is overpowered by the growing line in the direction of D. Likewise D is overpowered by the numerous broad bands beyond it, so that when the spectrum is seen faintly, these variable lines might easily be mistaken for C and D, and a greater degree of identity might thence be considered to prevail between the sun and sky spectrums than actually obtains.

"The moon was not well situated for spectrum observations, though drawings were obtained on August 13th and 15th at altitudes of 25° and 38°, and at times two days before, and on the night of the full moon.

"The most striking feature was the blood-red character of the red end; beyond the extreme intensity of this colour, the other tints had nothing notably different from a sun spectrum. Notwithstanding the amount of red light, no lines could be perceived there; in this circumstance was a striking difference to the low-sun spectrums, where, as the red became prominent, the number, size, and visibility of the lines in the red increased also. The first line identified, in advancing from the red end, was the growing line between C and D; from thence was a long blank space, until three fine lines, near E, were seen, then E and F. These observations were direct.

"Eight drawings of the violet end of the sun's spectrum, two of the sky's, and two of the moon's, were obtained, but most of them laboured under the untoward effects of the speculum. It may suffice to remark that at Guajara, the vertical sun and spectrum terminated beyond H, while the horizontal sun spectrum was so shortened at that end as to terminate between H and G.

"Again, comparing a high sun spectrum, at the sea level, with a similar one at Alta Vista, 10,702 feet high, both observed direct, it was found that, while in the former the spectrum terminated immediately beyond H, and the two bars of H were nebulous, in the latter the spectrum extended beyond H to three times the distance of its bars asunder; the two said bars also lost all their nebulosity, being clearly resolved into their component lines; many fine clear lines were seen between them, and many appeared nebulously in the space beyond. In the sky spectrums, and more particularly in those of the moon, the prominence of G was remarkable; next came F, while H was nearly, if not quite, invisible.

"At Guajara, many experiments were made in the dark optical room with a quartz train, lent by Professor Stokes, but they are all unfortunately faulty, by reason of the speculum employed.

"Of two large drawings that were made on August 10 and 12, near noon, one terminates at the limiting line, in a drawing of the extended spectrum, furnished to me by Professor Stokes, the other contains two lines more. . . . . . . The mean, then, of the observations, on August 10 and 12, shows that a little more of Stokes' new portion was seen on the mountain than has been seen near the sea level, notwithstanding the drawback of the speculum; while, if we add for that which we are fairly enabled to do from the two views of H—direct and reflected—we may assume that there is a much greater amount of the more refrangible rays in the sun's light in the upper than in the lower regions of the atmosphere.

"This result is confirmed by another observation. The spectrum formed by the quartz train was frequently photographed on a collodion plate, and the image so formed was found identical with that presented to the eye by uranium glass. Taking these powerful photographic effects as an indication of the abundance of rays of high refrangibility, it is very remarkable to find, on looking over my landscape photographs, about 200 in number, and pretty nearly equally divided between the three stations, Orotava, Guajara, and Alta Vista, that not only is there always a greater intensity, but that the distances came out invariably much better in proportion as the station is higher.

"At the height of 10,702 feet, the eastern wall of the crater of elevation, distant some four miles, is given with all the detail that the eye could appreciate at the time; while at the sea level on the finest mornings, and when the cliffs above Realejo, not three miles distant, were vividly illuminated by the morning sun, and casting on one side dense and dark shadows, yet the photographs would persist in giving nothing but the mass of the mountain in one uniform tint, save only one remarkably white stratum. This, at least, testifies to the focus having been exact; while the detail of things in the foreground is represented with such vigour as to prove that the quality of the photographic material was by no means deficient.

"In place of showing the mountain with all the intense detail brought out to the eye by the sun shining strongly on its rocky slopes, the appearance was rather as if that luminary were on the other side, and we only saw the shaded form of the ridge. Or it might be likened to the effect that would have taken place to the eye, had the mountain been seen through a much greater depth of atmosphere, or had that atmosphere been thicker as with a diffusion of smoke throughout it."

These results are very curious, but far from throwing any light on the theory of atmospheric absorption, they seem to render the subject more complicated than ever. We can imagine a medium acting like a sieve, and obstructing the spectrum at one end or the other, to a greater or less extent, according to its thickness; and, bearing in mind the results obtained by Herschel at the heat end of the spectrum, and by ourselves at the chemical end, we were prepared for a discovery of greater transparency at the two extremes—that the observer might possibly penetrate further into the red, and further into the violet end; but, instead of this, the actual extent visible seems to be even less at each end, at an altitude of 8,900 feet, than near the level of the sea, whilst the chief effect of the atmosphere is apparent in its absorptive action on points in the intermediate parts of the spectrum.

We cannot help suspecting that the observer missed the lines in the spectrum of the zenith sun, not because they were really absent, but because the brilliancy of the contiguous luminous rays was such as to render invisible, by irradiation, the narrow black lines. Our own researches on the spectrum, during many years past, have convinced us that the whole spectrum is entirely covered with a mass of dark lines, of varying degrees of intensity and visibility according to the brilliancy of the light, the diameter of the slit, and the optical power brought to bear upon them. With

a bright beam of sunlight, and a slit of a diameter of 0·005 of an inch or upwards, the fainter and finer lines are almost invisible, by reason of the dazzling brightness of the luminous lines, but with a diminution of the aperture, they reappear at once, and every increase in the magnifying power seems to bring them into existence in such numbers that, at last, the usual distinctive features of Fraunhofer's lines have entirely disappeared, and the eye in vain seeks for some point of resemblance. What is gained in detail seems to be lost in breadth of effect, and it is difficult to imagine that the one spectrum is nothing more than the former viewed under more accurate circumstances of illumination, production, and magnifying power. The spectrum seems to resemble, in this respect, some of the more distant nebulæ which entirely alter their character and outline, according to the power of the telescope which is brought to bear upon them; and, on this account, we think it more probable that some of the vacancies observed in the zenith spectrum, by Professor Smyth, might have been seen to have been fitted up with lines, provided the circumstances for observation had been such as to allow of deliberate and long-continued experimental research. We wish that more had been told us about the photographic results obtained with the spectrum; here, the above sources of error would not have interfered, as it would have been very easy to have taken spectra for comparison near the level of the sea, with the sun at any desired altitude, and, knowing the diameter of the slit to be employed, the identity or dissimilarity of the two effects could be at once seen.

To scientific observers the "Great Dragon Tree," of Villa Orotava, could not fail to be a subject to attract their attention, possessing as it does the reputation of being the "oldest inhabitant in the world," having seen some 6,000 years come and go since it first took root. In fact, several pages of the report are occupied in a critical examination of the evidence upon which this enormous age is arrived at, and in a discussion of the various accounts of this tree, which are already before the world. An amusing instance is here given of the manner in which popular accounts of celebrated places and scenes are made up to suit the popular taste. Towards the end of the last century an artist named Ozone, who accompanied the Chevalier De Borda to Teneriffe, made a sketch of the tree. Humboldt, in the "Atlas Pittoresque," also gave a view of it, not, however, copied from nature, but through the medium of M. Marchais, from this sketch of Ozone's. And finally, MacGillivray, in his account of Humboldt's travels, has given a third sketch, copied from the plate in the "Atlas Pittoresque."

Photographs from Ozone, Humboldt, and MacGillivray, are given. Compared with the one of the tree itself, they show the immense debt which the scientific world owes to the inventors of photography, not only in replacing the artist's original sketch, but also in performing the subsequent copyings: for induction from the facts clearly demonstrates that even in the simplest feature, man following his fellow man diverges inevitably at every step further and further from truth, as it is in nature. Thus, not only does the tree in each succeeding copy rise to a greater height than before, its foliage becomes more abundant and conformable to European types, its trunk more ligneous and solid, and the ground round about more flat and open, but a mere bit of gardener's scaffolding, that supports a bending branch on one side of the tree, and has nine cross bars to permit vines to clamber up, is transformed by Ozone into a ladder with 14 rounds, increased to 28 by Humboldt, and to 32 by MacGillivray, each of them professing all the time to give a faithful reproduction of his predecessor's picture.

As stated at the commencement of this article, it was considered that a series of photographic records of the various natural objects in Teneriffe would be of great value and interest, as they would be more able to illustrate the various natural features of the localities described than hand drawings. The following observation show how little appreciated were the beautiful stereoscopic pictures which, in accordance with this suggestion, Professor Smyth employed all his spare moments to take.

" . . . . With the assistance of a professional printer in Edinburgh, I was enabled, in the beginning of 1857, to present the Admiralty with a series of 74 double positive pictures on paper, forming vol. x. of the MS. report, besides a few others attached to vol. vi., and now in the possession of the Royal Society. Vol. x. was also presented by the Admiralty to that body with the subsequent offer from myself, through their secretary, of assisting in the preparation of enlarged glass negatives of any subjects that might be selected for illustrating the report; but after several months the collection was returned.

"Duly bearing in mind the bursts of enthusiasm with which the birth of photography was hailed by all scientific men, and the prophetic descriptions that were indulged in by the venerable Arago, and a circle of the philosophers of that time, as to the infinite improvement which would, from that day forward, occur to all scientific illustrations, which were, according to them, no longer to be left to the caprice of an artist, but were now to be submitted, 'during their formation, to the rules of geometry,' some disappointment must be felt on looking round now, and finding how little has been brought to pass of those magnificent dicta, uttered years ago by great men to whom the world gave implicit credence.

"In spite of such predictions, photography has not taken that special and useful line on the strength or the hopes of which the French Government were moved in 1838; for it is not reforming and supplanting all other methods of illustrating scientific memoirs. Where is the fault or difficulty? It is not in photography itself, for an example of the perfectly practicable nature of Talbotype photographic illustration has been offered by the well-known scientific publisher, Mr. Lovell Reeve; for having been applied to, about half a year after the official Teneriffe report had been read in public before the Royal Society, to issue a popular narrative, he was so much struck with the amount of important fact, geological and botanical, contained in some of the photographs, that he undertook to introduce twenty of them into an octavo volume; and accomplished it at the most difficult season of the year, viz., the depth of winter, for so large an edition as 2,000 copies."

Has this Teneriffe experiment, then, served to prove or disprove the propriety of Newton's opinion as to the favourable qualities of high mountains for astronomical observatories?

Most eminently, we may answer, to prove it; for how otherwise could so large a harvest of astronomical and general scientific facts, as are indicated in the report, have been gathered in so short a time, and by a single government servant, limited in the expense he might incur to one-sixth or one-tenth of what an ordinary expedition usually costs the country? If, too, for more than a century the suggestive proposition of Britain's greatest philosopher was neglected because thought impracticable, what an efficient answer can now be returned in the simple statement that the Admiralty gave their sanction for preparations to be commenced on the 30th of April, 1856, and within nine weeks from that date an astronomical station was successfully established on Mount Guajara, at an elevation of more than 5,000 feet above the clouds.

When the whole of the trial had been concluded and the instruments brought safely home, an eminent French savan, reviewing the entire proceedings, emphatically wrote that the little expedition which returned to England in October, 1856, had inaugurated a new and powerful system of astronomical observation; and he proposed that France should at once follow in the same line with a station on the Pic du Midi.

France, however, has not yet taken this step; and the working out of Newton's happy idea of mountain astronomy still remains to Newton's own countrymen.

PHOTOGRAPHY AT THE SEAT OF WAR.

(*From our Own Correspondent.*)

Casastroso, May 13.

SIR,—I was about to leave here, intending to make my way to Alessandria, when I heard of a great movement among the Austrians in Vercelli; at the same time that I was told by parties of Sardinian and French cavalry who come here from time to time, that they would soon be down in force to attack the enemy, consequently I determined on remaining where I was until something decisive took place.

The distance from Casastroso to Vercelli is only about seven English miles, at least; judging by the time it took me to walk near enough to see the people moving about the streets with the aid of a reasonably good opera-glass, I should not think it more. I often see parties of Austrians, sometimes infantry, but generally cavalry, when I am out walking, and I take care to put myself out of their way until they have disappeared; but the Piedmontese do not seem to care for them: I have seen them go on with their work without hardly turning their heads round as the Austrian cavalry went tramping along the road beside them. There is none of that savage enmity between them which characterised the war between the French and Spaniards. It is not to be supposed that the Piedmontese have any partiality for the men who plunder them, that is hardly to be expected; you would be rather surprised yourself if you heard a man who had just had his watch stolen, profess a very lively interest in the welfare of the thief, even though he were one of his own countrymen; but barring these exactions, I don't think the Piedmontese have much to complain of. Of one thing I feel pretty certain, that if the troops of almost any other country except Austria had invaded Piedmont, the people would have had much greater cause for complaint. As it is, I have heard frequent complaints of the French soldiers having deluded young women from their homes; but no official complaint can be made on this score, as there is no question whatever of violence; the women have acted of their own free will.

On the 11th the Austrians sent out detachments of considerable force from Vercelli in this direction, some of whom passed on towards Desana, which is a rather larger place than this, and about two miles distant on the main road. As soon as it was pretty certain that they were coming here, my camera and tent were stowed away in a hiding place prepared for it at the back of an outhouse, where even a Croat would hardly think of looking for anything to take away with him. I walked into the fields smoking a cigar, feeling certain that they would not go out of their way to meddle with a single individual unless they had some special reason for so doing, but in getting out of the frying-pan I tumbled into the fire, for I had not gone very far before I saw a party of Austrians lying under the shade of a cluster of trees. As I had never thought of meeting any of them in this direction I had not kept a look out, and they saw me before I saw them. To go back would have looked suspicious, and there might have been the same objection to have gone direct to them, so I did neither, I turned aside and walked in the direction of Sali. Presently I heard loud shouts, and turning round I became conscious of a number of hands beckoning me to come back; a gesture I thought it prudent, under the circumstances, to obey. As soon as I was within a few yards, an officer stepped forward and addressed me in German. I know a little of this language, but I did not think it advisable to appear to do so, so I answered him in English, which I found he understood perfectly. He asked me some questions, which I answered freely; and ultimately I told him what my intentions were in coming to Piedmont. We parted very good friends after a short conversation, during which he told me he thought my desire to see a battle would be soonest gratified if I remained where I was.

All that day I saw troops passing to and from Vercelli, but I fancy that many, if not all, of those who left returned the same evening "bringing their spoil with them."

The troops that continually pass and repass within a short distance prevented me from taking my camera out, as I am afraid they might imagine I had some sinister design against them, and it is even possible they might fancy it to be some new implement of war, and deprive me of it under that impression; but the greatest danger arises from the former reason, from their fancying that I may be taking plans of the Austrian positions in and about Vercelli for the benefit of the Allies. Consequently the time hangs heavily on my hands, in spite of the marchings and countermarchings. Now and then we are roused by the report of guns at no great distance. Last night I heard reports of heavy guns and got up and dressed myself, and went along a bye-lane leading to the road which runs from Vercelli in the direction of Ivrea, and could distinctly see the flashes of cannon fired from a point I imagined to be about two miles from Vercelli, and pointed in the direction of that place. It did not last long, and no notice was taken of it by the Austrians as far as I could perceive, though a good number of them are camped outside the town. I could see the lights moving about among them, but, considering the distance from which the cannon were fired, none of the balls could have reached them, and the firing must have been out of mere bravado. I have been told this morning that it was a party of Sardinian artillerymen, but, whether Sardinians or French, they have disappeared for the present.

I was interrupted just as I had got thus far in my letter by the arrival of a party of French cavalry in the village. They stopped here to ask the old people some questions, and caught sight of me. As my appearance showed pretty plainly I was not a Piedmontese, the officer, I presume, thought I must be an Austrian, and began to catechise me rather roughly, but the sight of my passport with the *visas* upon it soon satisfied him. There is a striking difference in the manners of the French and Austrian officers, by no means in favour of the former. The latter were quiet, and though sometimes stern in their mode of speaking, there was no arrogant assumption of superiority such as that which I have observed to characterise the generality of the former, and which is so exceedingly offensive to Englishmen. The Frenchman is polite enough to those whose superiority he cannot dispute, but when it comes to dealing with poor people, the true nature of the man peeps out. I was talking to a priest the other day, and he told me that this assumption of superiority had given great offence to the Sardinian officers, by whom the French officers were very generally disliked.

From what I hear from the detachments and the increased frequency with which they appear, I have no doubt that the French and Sardinian troops are collecting in the vicinity in force; and as the Austrian officers told me, and it is common talk among them, that they will not abandon Vercelli, there can be no doubt that a few days will see a battle fought there, which will certainly be a very bloody one, as the Austrians are in considerable force and have strengthened the place very much with earth-works.

I am very much surprised to find how quietly things go on, notwithstanding the excitement which must naturally exist when we can almost see two hostile armies in presence of each other. From what I had read of war I fancied that everybody must live in fear and trembling who happened to be in the vicinity of an hostile army, and so no doubt your readers imagine, but this is not so. I see the people about me get up at daybreak and go out to their work in the fields, as, I suppose, they always have done, and in the evening they assemble at the wineshop, or form a group where the streets cross in the middle of the village, to talk over the chances of the war. Among these assemblages the women are very conspicuous, not only by their numbers but by their volubility. Their opinions are not of much value, of course, but, I must say, they have a very low estimate of the results to be derived from the *Tedeschi* being driven out of Italy, and curse the war in very energetic though a very barbarous kind of Italian. It would be very strange if it were other-

wise; most of them have lost more by the invasion than they can recover for a long time; and it is the nature of man to feel more acutely his own material losses than any imaginary grievances under which men with whom he has no connection may happen to labour. I must confess that I entertain their views to a great extent, although I look upon the war and the results it may lead to with greater knowledge of the subject than they possess. "What," I have heard them ask, "have we, Sardinians, to do with freeing the Italians? We are overwhelmed with taxes ourselves. We have nothing to gain by war, while we lose everything, even our children. If the Emperor of France wanted to give the Italians liberty, why didn't he do it himself, without drawing us into the matter? The French say they are more than a match for the Austrians, so they did not want our help." Such is the kind of language I hear everywhere about here. Possibly it may be different in Turin, where the people are far removed from requisitions and so forth. Before I came here I used to hear it said, and to read in newspapers, that the Sardinians were most enthusiastic on the subject of war; but I suspect now that the enthusiasm was confined to the people about the court, and the press which they inspired. The latter being perhaps the most unprincipled press of any State in Europe; making statements, which it knows to be false, at the bidding of this or that individual. As an illustration of the reliance that may be placed on assertions made by the Turin newspapers, I will just mention a fact which may place your readers on their guard in future. It was stated in the Turin newspapers, and among others, in the *Piedmontese Gazette*, that Count Cavour's reception on his return to Turin was of the most enthusiastic kind; that he was publicly serenaded, and that a magnificent procession, with lighted torches, marched to his house, &c. Now, I have been told by a priest and two other persons since I came here, that the whole thing was a farce, and was a most ridiculous affair from beginning to end. These persons assured me they were present and saw it, and I have no doubt whatever that they told me the truth. The fact is, the Turin newspapers are mostly conducted by foreigners, who have their own purposes to serve.

All this is not very photographic, is it? but photographers are men, and have the same interest in learning what is going on in the world as others; and if what I have heard be true, that no newspaper correspondents are to be allowed to travel in Piedmont, they will thank me for writing and you for publishing my letters. Besides what I have been told, I can see signs myself of something important being about to take place, the Austrians are hurrying towards Vercelli from different points. . . . .

J. L.

A NEW DRY COLLODION PROCESS.

BY P. C. DUCHOCHOIS.

All the preservatives for the dry sensitive collodion film have some defects too well known to be described again. The principal of them is certainly to destroy to some extent the sensitiveness of the plate. I believe that the process I have the honour to communicate retains better all the sensitiveness of dry preparations, and gives more easily a good intensity to the negative, than any other.

The process is:—

1st. Immerse, after washing, the sensitive film in a solution made by boiling three or four hours one pound of liquorice roots in half a gallon of water, evaporating to 30 ounces, adding 3 ounces of alcohol, and filtering—the liquid is used cold.

2d. After exposure, immerse the plate in—

Water	... ...	1 ounce.
Nitrate of silver	... ...	20 grains.
Acetic acid	... ...	5 drops.

This renders the glycyrrhyzine insoluble, and prepares the film for a more even development.

3d. Develop with a saturated solution of gallic acid in water, to which is added, little by little, during the development, a quantity of the above solution of nitrate of silver, which is judged necessary to bring out the impression.

The collodion I use for the dry process is prepared according to the formula I gave some months ago (see "PHOTOGRAPHIC NEWS," vol. i., p. 233). I have, however, made some modification in it, for the addition of ammonia destroys the properties of pyroxyline to such an extent, that a very thick contractile plain collodion in less than a month becomes very fluid, settles in giving a rotten, horny, and opaque film, which splits in little networks.

These defects are easily prevented by preparing the collodion as follows:—

First, make the collodion with three parts of ether, two parts of alcohol, ½ minim of ammonia, and 2½ grains of pyroxyline to the ounce. After 4 or 5 hours, neutralise the free ammonia with two drops of hydrobromic acid, then add 3 grains to the ounce of pyroxyline.—*American Journal of Photography.*

PHOTOGRAPHY OF THE PASSIONS.

The circle of the scientific press recently assembled to hear read an interesting paper, by Dr. Malley, on an album of the mechanism of the physiognomy, composed by M. Duchenne.

Our readers are aware that Dr. Duchenne's process of analysis consists in putting the muscles of the face in motion by means of electrical excitement. In order to preserve a record of these expressions, which disappear almost as soon as they appear, the experimentalist had recourse to photography, under the able superintendence of the younger M. Tournachon. The principal points which result from these remarkable researches are as follows:—

There are in the human face grand lines which control the expression of the remainder; the eyebrow is one of these, and certainly the principal one; by its elevation by means of a muscle situated in the forehead, astonishment is depicted, also attention and surprise. For this reason, M. Duchenne calls the frontal muscle the *muscle of surprise.* In this movement, which is that which may be observed on every face in the pit of a theatre at the moment of raising the curtain, the eye uncovers itself as much as possible the better to receive the impression communicated externally. The contrary expression, that is to say, the lowering of the eyebrow, is produced by the superior portion of a muscle which enters into the composition of the two eyelids, which is known by the name of the *orbicular.* Its contraction expresses reflection, and gives a clouded expression of countenance; hence it is termed the *muscle of reflection.* A little muscle situated in the eyebrow is called the *muscle of grief or pain,* because it produces that expression when set in motion. Another muscle, the pyramidal, placed across the root of the nose, seems intended to express viciousness, and its energetic contraction gives an indescribable expression of ferocity to the countenance; it received the name of *muscle of malice.*

Two other muscles, situated on the cheek beside the cheek-bone, the great and little zygomatic, control laughing and crying. There are several other muscles whose expressive functions are depicted in the album before us, but as they occupy a less important rank than those we have named, we shall pass them over in silence.

To estimate the degree of influence on the expression exercised by each of these muscles, their contraction was excited in succession at the moment when the countenance was immobile; and to make the experiment more decisive, the face on which all these passions were by turns depicted was that of an old man, and was, moreover, partly paralysed. Contractions were determined which were simple or isolated; these were expressive or inexpressive; then, passing from the simple to the compound, the muscles were made to contract in pairs, or groups of three, compound contractions were thus obtained, which are termed concordant when they express a single passion, and discordant

when they have no other result than to produce grimaces. Some muscles, as we have already mentioned, enjoy the exclusive privilege of depicting by their individual action the expression proper to them; their simple contraction, therefore, is completely expressive. This effect was formerly attributed to the simultaneous contraction of several muscles. The researches we are considering demonstrate that this apparent general contraction of the features of the countenance is nothing but an illusion produced by the influence of the lines of the eyebrow and the forehead on the other features, without any other action than a relation of vicinity, such, for instance, as that observed in the case of different colours placed side by side. A fortunate chance led to the meeting with a young man who had accustomed himself to reproduce, with great art, on his physiognomy the various expressions of grief, anger, surprise, &c.; this enabled the experimentalist to compare the effects of electricity with those of the mind. In each study care was taken, in the first place, not to excite more than one side of the face, the other being left immobile; so that, by acting upon them alternately, it was easy to judge of the change effected in the general appearance of the face under examination.

It is, as will be seen, a kind of living anatomy, the anatomy of the nude, as artists term it, which will have a powerful influence on art, dissection, and physiology.

Some of the muscles of the face were very little known; putting them in motion by means of electricity has allowed of their being isolated. The pyramidal and the superior part of the orbicular of the eyelids are among these. Physiology ought, naturally, to acquire from these researches a more perfect knowledge of the function of the muscles, and of the nervous branches which lead to them. As to art, it is easy to see the advantages it may derive from photographs of the passions so truthfully represented. To render our most secret emotions and passions with as much delicacy as vigour, it is necessary to know what organs nature employs to express them. The artist who is wanting in this knowledge commits a fault against the mute language of the passions; to depict correctly, he ought, therefore, to know exactly the laws of the expressive movements, the *ensemble* of which constitutes the mechanism of the physiognomy.—*L'Ami des Sciences.*

Critical Notices.

Photographs at the Handel Festival.—NEGRETTI AND ZAMBRA, Hatton Garden.

THAT the Handel Festival, which formed the staple of the conversation at every dinner party in London for several days, should have passed by without being recorded photographically, would have reflected discredit on our art. To give a truthful picture of such fleeting scenes as these is one of the chief advantages of photography, and such an occasion as that referred to above was not allowed to pass without its services being called into requisition.

Those who were present will remember the precaution taken to exclude the sunlight from the orchestra—a precaution which, however much it added to the comfort of the audience, by no means facilitated the operations of Messrs. Negretti and Zambra, of Hatton Garden, who are the photographers attached to the Crystal Palace—especially as the awning was formed of a yellow-coloured waterproof material, and as the roof of the transept itself is covered with calico: the glass of the roof itself, moreover, being of a peculiar tinge not at all favourable to photographic operations; thus rendering necessary an exposure ten times longer in duration than would be required in an ordinary glass room. We do not enumerate these drawbacks to excuse the pictures obtained under these conditions, but to show what skilful photographers can accomplish under adverse circumstances. The pictures were taken from the organ loft, the first on Saturday, the day of the rehearsal; the second on Wednesday, when the "Messiah" was given; and a third on Friday, when the attendance to hear "Israel in Egypt" was even greater than on the previous days. If the print taken on Wednesday may be taken as a specimen of those taken on the other days, which we have not yet seen, they are undoubtedly good. By looking at the faces with a suitable magnifying glass it is not difficult to recognise those with which we are acquainted, and in this respect the print is far better than that taken on the occasion of Her Majesty visiting the Crystal Palace with the Emperor and Empress of France.

The Photographic Art: its Theory and Practice.—Revised by JAMES MARTIN. London: Houlston and Wright.

It cannot often be made a charge against writers that they give the public too much for their money, and such a charge would apply less to writers on photography than to any others; but this complaint might be made with justice of the book bearing the above title. It is true, it does not profess to be an original work, and might be designated the reprint of a reprint—the work having been compiled in the first instance by Mr. Sparling, and revised and corrected by the present editor, which no doubt may account for the liberality as regards the quantity of matter. To review a book, which is little more than a series of extracts, is a somewhat difficult matter, the only opening offered for criticism being the judgment with which those extracts have been made. In the case of the book before us, the editor has avoided laying himself open to the charge of having omitted much valuable information; but, in selecting that which is really valuable, he has mixed up with it a good deal which might very well have been dispensed with.

With few exceptions, which we are not disposed to look upon as of very great importance, the book, as we have already observed, does not err on the score of containing too little; on the contrary, the value it would otherwise have possessed is greatly reduced by the copiousness of the extracts, page after page being in some cases occupied in treating of a process which could have been as completely described in a very small compass; to the confusion of the beginner—for whom alone the book is intended—who, by reading so much, is at a loss which particular process to follow, and who, probably, ends by following neither implicitly.

It is, however, so much more agreeable to praise than to blame, that we have looked carefully through the book in the hope of discovering something original, which might justify us in recommending it to our readers, and at last we succeeded in discovering a paragraph commencing "The Author's Process." There is nothing to be said against this portion of the book as far as it goes; nay, it may fairly lay claim to the merit (wanting in other portions of the book) of extreme brevity, for including an elaborate description of an operating room, with a plan on a pretty large scale, it occupies little more than four pages; this can hardly be considered sufficient to entitle the work to a high place in photographic literature.

The best written and most complete portion of the book is devoted to a branch of photography now but little practised, namely, the daguerreotype process. The description of the manipulations, and the apparatus required, is most elaborate, and any person wishing to practise this process could not do better than purchase the book. We may almost say the same of that portion devoted to the optics of photography, which is both clearly and concisely written. His directions on the score of the necessity of extreme cleanliness we entirely endorse; and we have ourselves lost no opportunity of urging this point, although it never occurred to us to suppose that any of our readers required instructions on this score like the individual who Mr. Martin says was constantly in the habit of writing to him to complain of failures, until he at last became tired of hearing them, and determined on paying him a visit to see the reason. He says:—"He commenced in a first-rate style of activity, took up a glass plate, picked up a piece of old linen that was lying on the developing bench in his dark room, with which he polished his glass, coated it, and plunged it in the bath. He then proceeded to arrange and focus me; he had a curtain over a beam, for the purpose of shading one side of the face; and, in his usual energetic manner, he gave this curtain a pull, in order that he might place it where he wished, and drew it suddenly along the beam (which I am sure had a month's dust upon it), and set a cloud floating about the room that would take at least three hours to clear away. He then put the plate in the camera, and, after exposing, he took up the glass holding the developing solution from out of a mess of wet, &c.; and in

pouring the developing solution on to the plate, he let a couple of drops fall on the latter from the bottom of the developing glass, furnished by some of the indescribable mess in which it had been standing. Considering this, and also that the atmosphere in which the plate was taken out of the bath was saturated with dust, and the state of the interior of the camera in which it was exposed, recollecting at the same time that the cloth with which he wiped the glass was taken off the sloppy bench, it is not to be wondered at that the resulting negative was somewhat similar to the first effort of a schoolboy in drawing a portrait over which he subsequently upset his ink. 'There, sir,' said he, 'how do you account for that?' Wishing to see if he would go on again in the same way, I said, 'Well, I scarcely know; try again.' Everything was repeated exactly as in the first instance, with this addition—he actually washed his glass in the water which had just washed the hyposulphite of soda off his last picture." We trust that Mr. Martin succeeded in convincing his pupil of the enormity of his trangressions, and bringing him to a due sense of what is required of those who enter upon the practice of photography.

In turning over the leaves of the book we alighted upon a section headed "On the Fading of Positive Proofs." Wishing to see what the editor had to say on this important point, we redoubled our attention, and were rewarded by reading the following extract—from whence derived is not stated:—"This matter has of late become of such importance that the Council of the Photographic Society decided a few months since upon appointing a committee, of which the writer has the honour of being a member, to examine and report upon it. The experiments required in order to be decisive, must necessarily extend over a long period of time, and it will be many months before the results can be fully known. The proofs which fade most frequently are those which have been fixed and also toned. It is this part of the process, so necessary to the artistic effect, which increases the danger." We had a dim recollection of such a committee as that referred to having been appointed some years ago, and of their having made a report on the subject now almost or quite forgotten; but we had no idea that any such committee was in existence at the present day, and it was not until we referred to the title-page, and found it to bear the date of 1859, that we were satisfied that we had not been examining a book of old date. Who the writer may be who ascribes an increased tendency in prints to fade after toning we know not; but he must have studied the question to little purpose seriously to entertain such an idea. Recent experiments have shown that the best guarantee for the permanency of silver prints is in the toning by means of salts of gold; and also that prints so toned, which have no inherent fault from careless manipulation, are, to all intents and purposes, permanent. As regards the cause of the alteration of photographic prints, there can be no doubt that it is due to the combined action of sulphur and humidity. In proof of this we may cite the experiments made by Messrs. Davanne and Girard, which was detailed in the Report of the Committee of the French Photographic Society.

In conclusion, we may observe that the objection we hinted at, as tending to lessen the value of the book before us, on the ground of the too great copiousness of the extracts of which it is composed, is to a certain extent mitigated by the addition of an excellent index, which renders the work of use as one of reference. Whether there can be any justification for a person compiling a volume, consisting of the more valuable portions of works which have cost the authors much labour and money, is a matter into which we will not enter. It is true that, in the case of one gentleman, whose work has been laid under contribution to a very considerable extent, the editor asserts that he had express permission; but such permission, we presume, can only be fairly granted by the author when he retains the possession of the work, and has not sold the copyright to the publisher.

The Pocket Stereoscopic Camera.

WHO has not seen in country cottages a great printed broadsheet, with a highly coloured wood-cut at the top, showing Robert Nixon, the prophet, in the act of cruelly goading and otherwise ill-treating his brother's oxen; and replying to the reproaches of his brother by predicting that they would not be his by that hour to-morrow—a prediction verified to the letter, for they were seized the next morning for unpaid church-rates; this literal fulfilment of his prediction establishing his reputation as a prophet for ever after—a reputation which it must be allowed was very cheaply obtained. But those were days when it was not necessary for a man to be capable of setting the Thames on fire to prove his title to be believed when he hazarded a speculation. Moreover the bucolic mind has always been peculiarly susceptible of receiving extraordinary statements, hence it firmly believes that the day will come when a farmer may carry sufficient manure for a ten acre field in his waistcoat pocket. The individual who uttered this latter prediction must have been a bold man—almost as bold as the photographer who not long since solemnly prophesied that the time was very near when we should wear our cameras on our heads, with the lens to serve as a ventilator, and so go forth with a pocket full of dry plates in search of the picturesque. We fear, however, that the maker of photographic apparatus has not yet arisen capable of producing such a very portable camera: nor, indeed, is it of much importance, if he delays to make his appearance for an indefinite period, inasmuch as a camera has been made which is to all intents and purposes what it professes to be—a pocket camera, or, as it is less briefly styled in our advertisement pages, "The Pocket Stereoscopic Camera."

This camera at first sight appears like a toy. We cannot persuade ourselves that the tiny apparatus before us is capable of being used in the serious business of photography, measuring as it does only two inches in depth, eight inches in length by four and three quarters in width; it is only on erecting the sides, and placing the front board in its place that we are convinced that we have a camera capable of taking stereoscopic pictures of the ordinary size, and possessing every quality ordinarily found in such cameras. It carries only a single lens, and is so constructed that pictures may be taken at an angle of 6 inches, which is the maximum, and, of course, at any angle within that limit. The arrangement for altering the angle is of the simplest description, and yet at the same time the most perfect imaginable; a mere touch of the finger sufficing to move the camera to the desired position with unerring accuracy: in fact, it is a perfect gem of its kind.

As regards its portability, our readers may judge of that from the dimensions we have given above, especially when we add that, including the focussing glass and dark slide, the entire apparatus weighs but 19 ounces, and can be dropped into a coat pocket with perfect ease.

Dictionary of Photography.

DISINTEGRATION, or pulverisation, is the act of reducing solid bodies to powder. Photographers should only use the pestles and mortars made of good Wedgewood ware, except, indeed, they are willing to go to the expense of one of agate. Glass mortars are very liable to break, marble is too soft, and iron, steel, or brass mortars are liable to introduce impurities into the solutions, either from mechanical abrasion of the surface or chemical action of the substance being powdered upon the metal. The operator should endeavour to reduce bodies to powder by a circular grinding movement of the pestle against the lower part of the mortar—only resorting to blows when the lumps are too large, or hard, to admit of that treatment. In striking a hard lump of any substance (cyanide of potassium, for instance), in order to reduce it to powder, there is great danger of causing some of the fragments to fly about the room; this may be, in great measure, avoided by placing the lump in the centre of the mortar and striking straight down on it, holding the pestle vertical. In some cases it will be found advantageous to wrap the lump very loosely in paper, or a cloth, and give it two or three sharp blows with a hammer on a stone, before attempting to pulverise it in a mortar; this plan must, however, not be attempted with substances of much value, or with those that are to serve for delicate photographic work, as some of the small particles cannot fail to be lost by adhesion to the paper or cloth at the point where the blow is struck, and, conversely, particles of organic matter will always find their way into the substance. In rough experiments, such as in preparing the mixture of *residues* and *flux* for a furnace operation, it

will be of great assistance if the contents of the mortar are, from time to time, poured into a sieve, and the coarse fragments returned for repulverisation. A mortar should always be cleaned out after being used. If there be any difficulty in getting it free from the stain of the substance last pulverised, a little coarse sand, ground round once or twice with the pestle, will be found an effectual means of cleansing it.

Distilled Water.—Water that has been converted into vapour by heat, and then condensed by cold into the liquid form again; by this means all the impurities usually met with, being non-volatile, are left behind, and nothing but pure water is found in the receiver. Distilled water being, however, prepared in large quantities, and sometimes in a not very careful manner, should always be tested by the photographer before being used. For this purpose take three perfectly clean wine glasses, and half fill them with the water to be tested; in one add one drop of nitric acid and a small crystal of pure nitrate of silver. If, on stirring well with a glass rod, the solution remains clear, and free from any milkiness, the absence of a chloride may be inferred. In the second glass add one drop of acetic acid and a small crystal of oxalate of ammonia; the absence of turbidity in this case shows the absence of lime, or its salts; and if the third glass remains clean, after adding a drop of nitric acid and a crystal of nitrate of baryta, the absence of sulphuric acid is shown. A sample of water that stands these tests, and is at the same time neutral to test paper, and free from any particular taste or smell, may safely be employed in any photographic experiment.

Double Iodide.—This term is applied to a solution of iodide of silver in iodide of potassium, and is employed in the calotype process for the purpose of saturating the paper with iodide of silver in a fine state of division. It is prepared by taking an ounce of distilled water and dissolving in it fifteen grains of nitrate of silver, then in another ounce of water fifteen grains of iodide of potassium; pour the solutions together and a yellow precipitate of iodide of silver will be formed, and will sink to the bottom; pour off the liquid, but be careful that none of the precipitate be lost; add three or four ounces of rain, or distilled water; stir with a glass rod; let it remain to settle; pour off and repeat this washing. The object of this is to dissolve out the nitrate of potassa which has been formed by double decomposition; the iodine of the iodide of potassium leaves the latter to go to the silver, forming iodide of silver, whilst the nitric acid unites with the potassium forming nitrate of potassa, which latter, being *soluble* in water, is washed away, or nearly so, in these changes of water, whilst the iodide of silver, being insoluble, is left behind. When it is well washed, pour off, carefully, as much water as possible, and then add 140 grains of iodide of potassium, and fill up with water to make one ounce. Probably these 140 grains will not cause all the precipitate to dissolve, in which case add a few grains at a time, until the whole of the iodide of silver is dissolved, and the solution becomes clear. This solution has the property of precipitating iodide of silver from it when diluted with water; and if it be brushed over a sheet of photographic paper, and when nearly dry dipped into water and well washed, the iodide of silver will be precipitated in an extremely fine state of division in the pores of the paper. For further particulars see the articles on the calotype process in our first volume.

(To be continued.)

The Amateur Mechanic.

Gutta Percha—*(continued).*

The specific injurious action of gutta percha vessels on photographic solutions has rarely been stated. The general fact, however, that nitrate of silver solutions kept in such vessels have been spoiled has been reiterated so often that there can be no doubt of the fact. A like charge regarding the effect of gutta percha on acetic acid has also been made. The important consideration is to discover the sources of such injurious action, to detect their presence, and, where it is possible, remove them. It appears tolerably certain that no chemical action on the solutions in question is produced by pure gutta percha. It has been alleged against this view that gums and resins *do* precipitate nitrate of silver. But gutta percha, strictly speaking, is neither a gum nor a resin, and is in most of its properties widely different from either. The fact, moreover, that gutta percha vessels have been used for years for nitrate of silver with impunity, points with sufficient force to adulterations as the cause of injuries which have taken place. These impurities, we have little doubt, consist, in all cases of foreign matter, in mechanical combination, either the result of want of care or fraudulent economy in the manufacture. The raw material, as it is imported into this country, is not unfrequently mixed with chips of wood, bark, leaves, earth, stones, &c., introduced before the sap has become concrete. All this is, however, carefully eliminated as a preliminary process in the manufacture of the article. The first step is to reduce it into thin shavings by means of a cutting machine; these shavings are then introduced into tanks of boiling water, by maceration in which the grosser impurities are separated, sinking to the bottom of the water. The partially purified gutta percha, now collected into one pasty mass, is then introduced into a box called a "teazer," containing a cylinder studded with jagged teeth. This cylinder, making about eight hundred revolutions in a minute, quickly tears the mass into fine shreds, which fall into a tank of cold water underneath; it is there collected in fine, clean, well washed shreds, all impurities having been removed. Where it is desirable to make assurance doubly sure that not the minutest chip of foreign matter remains, a further process is resorted to: after again being reduced to a plastic mass by boiling, it is forced by steam power through sieves of fine wire gauze, by which the smallest particle of intractable matter is arrested, and the entire purity all passing through perfectly assured. Through all this, however, in getting rid of one class of impurities another danger has been incurred. Gutta percha is porous in structure, and has the property of absorbing a large quantity of the water in which it remains for any length of time *at boiling heat.* As much as 25 per cent. of water has, we believe, been detected in some samples of gutta percha. Here, to the dishonest manufacturer, without further adulteration, is presented a ready means of obtaining bulk and weight without cost, and here, to the photographer, is a pregnant source of injury. Means should be taken, and we believe in honest hands are taken, to get rid of this water. This is effected—we here refer to the process we have seen in operation at the works of the Gutta Percha Company—by means of powerful mastication. After the last boiling, it is introduced into thick strong cylindrical iron boxes called "kneaders;" in these boxes revolve a couple of rollers with irregular screws on their surfaces. The boxes being filled and their lids firmly bolted, the mass of gutta percha is subjected for some time to the masticating process, sufficient pressure and kneading being applied to expel all the water absorbed in boiling, and to reduce the whole to a homogeneous mass of uniform consistency. In this state it is sufficiently plastic for manipulating or fashioning into any form, and should not again be heated to a greater degree than is necessary to insure such plasticity.

Thus much for the impurities of gutta percha, which may be incidental or accidental. There are others, however, more fraudulent in their character, and more injurious in their results; fortunately, however, generally more easily detected by the appearance they impart. As we have before stated, at a temperature of about 250 degrees gutta percha melts, and a great variety of substances for the purpose of adulteration may then be incorporated with it: earthy matters of various kinds, saw-dust, &c.; it is unimportant to specify the various adulterations thus added, they are all sufficient to render the article totally unfit for photographic purposes. Vessels made of such mixtures generally become brittle and useless even for the commonest purposes, possessing the defects of earthenware without any of its advantages. By a very little care in examining, these spurious articles may be detected by their appearance. We will describe two which have recently come under our observation—and we almost wish we had a photographic *index expurgatorius* in which we might insert the manufacturers' names. One, an expensive bath with water-tight top, was of a yellowish brown colour, very much mottled in appearance, not unlike in colour and general effect to soft

soap solidified, or cakes we have seen of compressed vegetables. This bath, on a very slight pressure with the finger and thumb, cracked with an irregular fracture, such as a piece of pastry might present. It is scarcely necessary to say that pure gutta percha can in no case present such an appearance as we have just described. Another sample, by another maker for photographic purposes, is a large washing tray, which is cracked like a piece of earthenware from a fall. Unlike the other in appearance, this is almost black, very rough, coarse, and *earthy* in appearance, not altogether unlike a dark clay. The appearance of the pure article, as we have said before, is of various shades of a greyish or reddish brown; when cut, presenting a bright, clean edge, homogeneous in texture, free from gritty particles—in no degree brittle. Adulterated samples rarely possess the same bright, homogeneous appearance, but are dull and earthy, or present an appearance of texture, and a mottled effect. They are generally much heavier than the genuine article.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 27th June, 1859.

To the observations placed at the head of my last letter concerning the action of light on salts of silver after this light has been made to pass through different substances, I will now add a few facts published four years after the experiments of Professor Hessler, by M. Malagutti, and recorded in M. l'Abbé Moigno's *Repertoire d'Optique Moderne* (Tome ii., p. 796).

M. Malagutti has shown in the most evident manner that liquid screens have a very marked effect upon the chemical properties of light which has passed through them. In order to judge to what extent this action takes place for different substances, he made some standard papers coloured by matters on which light has no action, and placed them against the chemical papers used in the experiments.

The standard or test papers of fixed colours were tinted with a mixture of carbonate of lead (*white lead*), Indian ink, and garance-laque, suspended in a mucilaginous liquid. The chemical or sensitive paper was prepared by plunging a sheet of paper first into anhydrous alcohol slightly acidulated with hydrochloric acid; when dry, it was placed in a weak solution of neutral nitrate of silver, and afterwards dried in the dark.

In performing the experiments, the sensitive paper was placed, together with the standard paper, in the focus of a camera obscura; and to assure himself that light is modified chemically by the different substances through which it passes, care was taken to place a piece of sensitive paper below the screen or solution on which M. Malagutti experimented, besides the piece placed behind this screen. Each experiment was continued until the sensitive paper had acquired, by the action of the light which passed through the substance examined, the same tint as that on the standard or test paper. The time which elapsed before the sensitive paper acquired this tint was carefully noted.

Here are some results obtained. The numbers express the relation existing between the time employed for the several substances named, air being taken as unity:—Air, 1·00; distilled water, 0·75; hydrochloric acid, 1·23; nitric acid, 1·48; essence of turpentine, 2·05; essence of citron, 2·85; essence of lavender, 3·14; creosote, 3·95. It would not, therefore, be very difficult to distinguish these several substances by photographic means. Absolute alcohol, wood-spirit, naphtha, ether, sulphuric acid, crystallisable acetic acid, and a few other substances, had no action at all, and would, consequently, be readily distinguished from the former.

We see by the above figures that instead of delaying the chemical action of light, as is remarked in the other substances, pure water evidently accelerates it.

In one of the late meetings of the *Academy of Sciences*, at Vienna, M. de Perger presented a few practical details "*On the Photographic Sensitiveness of Asphalt.*" After discussing the use of bi-chromate of potash, gum, and charcoal, according to Mr. Pouncey's method, M. de Perger remarked that he had observed some years ago that asphalte, spread in thin layers on metallic plates finely polished, showed itself sensitive to the action of light, and that he had, at that period, endeavoured to employ this substance photographically. He did not, however, employ the asphalt in its rough state, but the purer product obtained by distilling commercial asphalt. He obtained excellent results on metal, on paper, and on lithographic stone. The first essay made with a view of multiplying asphalt images (obtained photographically) by means of a lithographic press, appear to promise great success for the future.

M. Schlossberger, professor in the University of Tubingen, has lately made known the following facts relative to the dissolution of cellulose, &c., by Sweitzer's ammoniacal solution of copper. This cupro-ammoniacal liquid dissolves, as is well known, cellulose and silk. M. Schlossberger has found that an ammoniacal solution of oxide of nickel possesses, with regard to *silk*, the same property as the copper liquid, except that whilst the dissolution of silk in the latter does not alter the blue colour of the solution, the nickel liquid changes colour and becomes of a yellowish brown.

According to the same author, the cupro-ammoniacal liquid has no action on gum or dextrine, but dissolves perfectly filtering paper (which may be considered as impure cellulose). Many salts, and especially solutions of alkaline salts, precipitate this dissolution; the precipitate thus formed offers not a trace of organisation, or of crystallisation. On analysis it gives precisely the composition of cellulose.

The same re-agents (alkaline salts) do not precipitate silk from its solution in the cupro-ammoniacal liquid. Here, then, we have a method for separating silk from cotton. A second process by which the same separation may be effected, consists in employing the nickel solution instead of the copper one; the former having no action on cellulose, but easily dissolving silk.

M. Schlossberger concludes his remarks by stating that a dissolution of cellulose in the cupro-ammoniacal liquid is likewise precipitated by alcohol, by a concentrated dissolution of honey, gum, or dextrine; and that the cupro-ammoniacal liquid has no action on gun-cotton or collodion.

M. Volpicelli, an indefatigable Italian physicist, has just made known, in a letter to M. Despretz, of the French Institute, a curious circumstance connected with the development of electricity by friction:—The first finger and thumb of one hand being covered with a woollen glove, or any other tissue, a small stick of Spanish wax (*cire d'Espagne*), or of resine-laque, is held in the other. If the wax be now submitted to a strong friction against the glove, it is found to develop *positive* electricity; if the friction is feeble, *negative* electricity is developed. These remarkable phenomena may be repeated as often as the experimentalist desires, a weak friction always producing negative electricity, and a strong friction positive electricity. In the passage from one of these states to the other, neutral electricity is met with.

Now, if a stick of wax a yard long is rubbed violently with a woollen cloth, it is found to be charged with *negative* electricity on its entire surface; but if a few slight passes are then performed upon this stick of wax with the woollen cloth, the wax becomes positive at one end, and remains negative at the other.

These seemingly paradoxical phenomena, which M. Volpicelli includes under the term *static-polarity*, are likewise observed when glass is acted upon instead of resin or wax; they are also seen with calc-spar, selenite, &c., and do not appear to be connected with the difference of temperatures produced by different degrees of friction, but, according to M. Volpicelli, with the difference in the *quantities of movement* employed in one case and in the other. These experiments are extremely interesting, they may be added

to those which tend to confirm the beautiful theory of the *correlation of forces* developed in so masterly a style by Mr. Grove. I would much like to see them repeated by my esteemed friend, Professor Thomson, of Glasgow.

Many attempts have been made to form an amalgam of aluminium, but without success. The mercury could not be made to adhere to the former metal. M. Tessier has found that if the aluminium be previously rubbed with a solution of potash of soda, mercury will unite and form an amalgam. But the latter is quite useless, for by this experiment a sort of galvanic pile is formed, and the aluminium becomes as electro-positive as calcium or barium, becoming quickly oxydised on exposure to air, decomposing water rapidly, &c.

A work on mathematics, by Mr. George Salmon, fellow and tutor of Trinity College, Dublin, has been forwarded by the author to the Paris Academy of Sciences. This work, entitled "Lessons Introductory to the Modern Higher Algebra," has been very well spoken of here by certain distinguished mathematicians.

M. Henri Sainte Clare Deville has just analysed cryolite, the mineral from which most of the aluminium now in commerce is extracted. M. Deville's object was to try a new method of analysis, which consists in treating the substance at a high temperature with caustic lime, by which cryolite is entirely transformed into caustic soda, alumina, and fluoride of calcium, substances which are easily separated.

This mineral, to which Henri Rose formerly called attention, as being a profitable substance for the manufacture of aluminium, is a natural fluoride of aluminium and sodium; M. Deville's analysis confirms that of H. Rose. He finds:—

	Theory.	Experiment.
Aluminium	13	12·8
Sodium	32·5	31·8
Fluorine	54·5	55·4
	100·0	100·0

Cryolite contains no potash, but, strange to say, in some specimens a slight quantity of phosphoric acid is found. This explains a curious phenomenon, observed lately by M. Morin, at Nanterre, near Paris, where a laboratory for the production of aluminium is in activity; M. Morin observed that as soon as the chlorine gas enters the heated tubes containing a mixture of alumina, chloride of sodium or coal (producing volatile chloride of aluminium, which is afterwards decomposed by sodium), a notable quantity of phosphorus is volatilised and received in the condensing apparatus.

J. Steenstrup, a well-known and distinguished naturalist, has published some interesting observations concerning the tape-worm of the little prickly fish that inhabits our streams and canals, called by the English *stickleback* (*Gasterosteus aculeatus*, and another species *G. pungitius*). The worm which inhabits these tiny fish is called *Schistocephalus solidus*; it does not inhabit their intestinal canal, but their abdominal cavity. On the contrary, this worm is often to be found in the intestinal canal of aquatic birds, whence it was concluded that the birds infected themselves by eating the fish, and the fact appeared to be proved by an experiment made by Abildgaard, who caused some ducks to be fed with sticklebacks known to carry the parasite in question, when the ducks soon became infected themselves. Steenstrup has shown, however, that the fish is not eaten by the birds (a kind of nutrition that would be dangerous to them on account of the spines on the fish's body), but the worms themselves, which, having acquired all the development of which they are capable in the body of the stickleback, pierce through the abdominal cavity of the fish, leave him completely, and crawl freely at the bottom of the water. The sticklebacks do not survive the wound thus produced. They die without exception soon after the parasitical worm has made his exit. The fact appears to have been suspected as early as 1825, by Baer, who found some *Shistocephali* alive and free in the water, not far from the bodies of some dead sticklebacks, whose abdomen had been pierced in the way described.

Steenstrup remarks, also, that some other kinds of worms, namely those *larvæ* or incompletely developed individuals called *Ligula* (which, like the *Shistocephali*, belong to the cestoïd group), which likewise inhabit the abdominal cavity of fish, perforate these parts at a certain period of their existence to come out and live freely in the water.

Photographic Societies.

Blackheath Photographic Society.

A meeting of the above society was held on the 20th ult.; the President, J. Glaisher, Esq., F.R.S., in the chair.

After the usual business had been transacted, Messrs. Henry Kent, Newton Crossland, Thomas Skaife, and William Kisser, were duly elected members of the Society.

Mr. Heisch exhibited two dry plates, one prepared by Hill Norris, the other by himself, by the meta-gelatine process; both had been kept so long that a dirty deposit formed during development. On the plate prepared by himself this was entirely removed by gentle friction with a pad of wet cotton; on attempting to do the same with Norris's plate, the whole picture came off in powder; but the point to which he called the attention of the Society was this, that the glass was still entirely covered with a transparent film. This film resisted the action of a mixture of ether and alcohol, but was removed at once by hot water; it was apparently a coat of gelatine. The question is, does Dr. Norris coat his plates with gelatine before collodionising, as has been lately so much recommended, or is his collodion so powdery as to let enough gelatine through to form this film? Mr. H. thought the former supposition much the most probable. Mr. H. also exhibited one of Derogy's lenses and the pictures taken with it, which were of the most satisfactory description.

Mr. T. R. Wheeler delivered a short paper upon Monkhoven's cellulose process, as recently employed by him; and exhibited a picture taken by it, as well as some prints from that picture. He adverted to the discovery of Schweitzer, of Zurich, that cotton and silk were soluble in cupro-ammonium, and to that of Pelouze as to the solubility of cotton in concentrated hydrochloric acid, and to the application of that discovery by Peligot, while Monkhoven of Ghent had collated what was previously known on the subject, so that the process was not unfairly named "Monkhoven's Process."

The author stated that the object of the several methods in which the ammoniacal solution of copper is employed is the same, viz., to obtain a solution of oxide of copper in ammonia. Monkhoven's plan was to throw down hydrated oxide of copper from commercial sulphate by liquor potassæ, and dissolve it thus obtained in liquor ammoniæ. Peligot's plan amounted to the same thing, and was the one he (the author) employed.

It consisted in placing copper turnings in a funnel in which somepounded glass was put, and pouring liquor ammoniæ upon it. The air oxidised the copper, and the ammonia dissolved it as fast as formed. The solution, which should be passed and repassed through the copper turnings that it may be saturated with oxide of copper, is allowed to stand, that all impurities may subside, and is then decanted. Carded cotton is then introduced in the proportion of about two parts to every twenty of the solution; it readily forms a viscid solution, and, that being complete, it is ready for use. Iodide of potassium is added dissolved in water in about the proportion of 2¼ grains to the ounce.

If well prepared, it is perfectly transparent, of a deep blue colour, and flows readily upon the surface of glass.

When employed as a photographic medium, it is poured as a film like collodion, and allowed like it to set, which is known by a whitish opalescent margin appearing; this occurs, of course, at varying intervals, on account of the varying state of the temperature and its hygrometric condition, but an average time is half a minute; it is then immersed in a bath consisting of water, 100 parts; nitrate of silver, 10 parts; acetic acid (glacial), 5 parts. A few seconds' immersion is sufficient. The surface of the film whitens, and should have a homogeneous texture. It is then exposed in the usual way, and, according to the author's experiments, requires rather a longer exposure than collodion, say 30 seconds. It is then developed. For this the author used—pyrogallic acid, 1½ grains; water, 1 ounce; acetic acid, 10 minims, washed and fixed with hyposulphite of soda. The picture obtained is in many respects a good one, and the process, generally speaking, one of much promise.

The advantages enumerated are its great cheapness, its facility, its uniformity of composition, and the fact that commercial nitrate of silver may be employed for the wash; also its remaining moist in very hot weather, and that it may be kept in the air many seconds before immersion. Its principal disadvantage—and it is that with which the author had principally to contend—is that the film is liable to become detached when immersed in the nitrate bath. It remains to be shown why this so frequently, and apparently so capriciously, occurs; the author believes it to be due to the energetic chemical action which takes place between the ammonia of the cotton solution and the acetic acid of the bath, which is required to be in excess to dissolve excess of copper. He intends making experiments on the subject with a hope of obviating the difficulty, as also to employ the "cellulose" as a dry process. With respect to failure, those accustomed to chemical manipulations will easily understand how hard it is to pronounce wherein it lies, since much disappointment must be encountered, and much inductive experiment used before success is attained. What becomes of the copper? The author believes that it, with the cotton in solution, acts as a base to a radicle in the first instance, and that excess is removed by the acetic acid as a diacetate. The author apologised for the hasty and imperfect manner in which his remarks were conveyed, but hoped to renew the subject with more effect and better success during the ensuing session.

At the conclusion a vote of thanks was tendered to Mr. Wheeler, and the meeting separated.

THE FIRST PHOTOGRAPHER.—Far away in the dim perspective of the past—so far, and in such obscurity, that the telescope of history has scarcely been able to penetrate deeper than sufficed to record the bare fact—lived a discoverer. Seated in his laboratory, surrounded by conventional alembics, retorts, and other strange-looking chemical apparatus, an alchemist is examining, with excited interest, a product which his furnace has lately bestowed upon him. Hope beams from that face, furrowed by nights of study and days of disappointment, and as his trembling fingers turn the opalescent fragment beneath his eyes, he imagines that he has just effected a great stride towards the attainment of the object of his life, and that the mystery which surrounded the philosopher's stone was, at length, yielding to his research and assiduity. He has just discovered how to convert silver into something quite different from itself. All that remains is to reverse the result, and the transmutation of metals will become an accomplished fact. And, lo! while he still examines his treasure, a new peculiarity appears. The metal, in its new form, not only darkens upon exposure to daylight, but has become possessed of the singular property of staining the skin of the operator so effectually as to resist the detergent powers of soap and water, or, indeed, of any chemical preparation known at the time. The fact is curious, and he notes it; but it is a fact which does not run in his peculiar groove, a phenomenon which does not promise to lead to the great arcanum. It is worthy only of humbler chemists. Is he not one of the guild of Al Chemia—*The* chemistry, *par excellence?* And he returns to his dreams. Very near to honour, very near to a place among the famous of the earth, was this *savant* of the middle ages, had he but known it; but, alas! for him, though in his graspings after the shadowy realities of alchemy, he had stumbled over the keystone of a ... science; so feebly glimmered the lamp of knowledge, so ...e was the night of ignorance, that, like the headless cock ...he fable, who spurned the jewel he had raked from the ...ghill, so, with a scant notice of its leading phenomena, did ... purblind philosopher consign the germ of photography to ...leep of centuries, which has remained unbroken until within the last eighty years. Little wist that follower of chimeras, as he put away the blackened fragment of what he was pleased to term *horn silver*, and went back to waste his wealth in the pursuit of the philosopher's stone, and his health in seeking after the *elixir vitæ*—that he was even then flinging away the corner-stone of a temple to the sun, more glorious than that of Balbec, at whose wonders generations yet to come would gaze in admiration and astonishment, and whose sacred mysteries would be presided over by all the great in art and science, who should live in an age of civilisation far more advanced than his own.—*Irish Metropolitan Magazine.*

Photographic Notes and Queries.

RETICULATION OF RE-DEVELOPED NEGATIVES.

SIR,—I am a hardworking photographer, and make a point of carefully considering (as well as one with but the most limited knowledge of chemistry can do) any of the phenomena that I meet with in the practice of the art to which I am much attached, in order to make myself as self-reliant as possible, and save the courteous Editor of the "PHOTOGRAPHIC NEWS" the infliction of "a great number of papers of no use to any one except the"—butterman; but, "having a grievance," I am forced in my extremity to solicit your kind assistance. To the point, then, with your permission, sir. I have been for a considerable time using "the same bath and collodion for positives and negatives," with the *best results*, always obtaining, with one-fifth the exposure I find necessary with the old pyro-developer and negative collodion, negatives than which I can see none better for great opacity without hardness. The method I employed is similar to that recommended by "F. R. C. S.," at p. 95, vol. i., of your useful periodical, excepting that I *never* use nitric acid, and but half the weight of citric acid of that of pyrogallic. But, to my mortification, about three weeks since I found that, upon drying, the surface of my negatives gradually *creped* or became reticulated until they were ruined; I tried several samples of collodion, but all with the same results; the positives are, as usual, good; proving that the effect is produced by the re-developer. I then tried the plan you recommended at p. 59, vol. i., in answer to "M. B.;" still the same *misfortune*, for so I feel, being obliged to revert to the negative process; it is like a regular railway traveller being forced to travel a bad country by stage coach in winter. I should not have written you now, did I not know of several practical men similarly circumstanced. Mr. Hardwich's observations, in your last number, do not seem to apply, as, in order to test the effect of atmospheric changes, I have experimented daily, and although we have had the most variable weather, I find no difference as to the particular phenomenon I mention. If "F. R. C. S." or any of your readers can and will inform me how I may overcome this unpleasant circumstance, I shall feel obliged. RETICULUS.

IMPROVED CAP FOR PHOTOGRAPHIC LENSES.

SIR,—Will you communicate to the knowledge of my brother photographers, through the medium of your valuable "PHOTOGRAPHIC NEWS," the following description of an improved cap for photographic lenses:—

Take away the ordinary cap of a lens, and put in its place outside a wooden ring (fig. 1), with two small flat

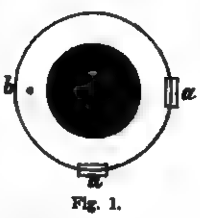


Fig. 1.

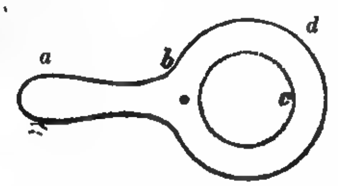


Fig. 2.

hooks, *a*, to prevent fig. 2 from descending any further than its proper place; and, to keep it close to it on this ring, fasten fig. 2 with one screw at *b*; now bear the finger on *a* to lift up *c*; a little velvet should be glued inside the circle *d*. The advantages are:—There is no danger of the cap falling off, and no danger of pulling the lens out of focus. In taking a portrait or a landscape, where there is much foliage, it enables the operator to expose the foliage, or the lower part of the picture, for a sufficient time without injuring the sky, or upper part of the impression.

It has also great advantage in securing a picture rapidly when no stop is used in the lens, and when accuracy of time is the utmost importance. N. C.

INJURIOUS EFFECTS OF HEAT ON COLLODION PHOTOGRAPHY.

SIR,—I am labouring under the following difficulty, and should esteem it a particular favour if you would oblige with your opinion and advice:—

I have no difficulty whatever in taking a good negative wet collodion in my room, or even in my tent, on a moderately warm day; on a hot day, however, I find the tent quite useless. The first indications of failure I find to be sundry marks on the plate when taken out of the bath. This you will, perhaps, attribute to dirty plates, or an omission to remove the film from the neck of the collodion bottle; but I am careful to guard against these causes of failure.

The other day I was determined to discover, if possible, the cause, but I really cannot account for it. The plates came out of the bath, as usual, quite mottled. I exposed several of them, but they were good for nothing, the image being weak and misty. The same chemicals gave the most satisfactory results in my dark room at home. I fancy you will say there must be diffused light in your developing tent; but this I assure you is not the case. The tent acts as well as my own dark room, except in hot weather. I tried more acetic acid to the bath (1 minim to 12 ounces), but with the same result. I also used three kinds of collodion.

I believe I am correct in referring my failure to the temperature; but how to be more successful in future I do not know, as it is impossible to secure cool days at this time of the year. I have asked the opinion of a photographic friend, but he has never met with the above difficulties.

If you would kindly favour me with a hint, you will greatly oblige A SUBSCRIBER.

[We think our correspondent is correct in ascribing the above effects to the high temperature, which exalts the action of all the chemicals used. We have remedied such a result by adding a drop or two of nitric acid to the bath; but care must be taken not to add too much, or flat, faint pictures, will be produced.—ED.]

VARNISH FOR ALABASTRINE PHOTOGRAPHS.

SIR,—Your courtesy in answering correspondents' questions emboldens me to put the following:—

In working the *alabastrine* process, described in the "PHOTOGRAPHIC NEWS ALMANACK," p. 31, I succeeded in obtaining several very good positives. In my simplicity, I varnished in the usual manner with best *spirit varnish*, when, to my dismay, the much-admired white appearance vanished, and my pictures became *darker* than by the ordinary process. Can you, or any of your correspondents, inform me, what varnish or other preparation to use to *protect* the picture, and not spoil the effect of the alabastrine process? T. H. S.

ANSWERS TO MINOR QUERIES.

VARNISH FOR NEGATIVES.—*A Banker.* Your idea is a very good one, but it has already been put into practice by M. Taupenot. Some years ago he recommended the employment of albumen for a varnish for negatives, and we must admit that his plan is very successful, although rather troublesome. It was described by him in *La Lumière*, as follows:—"After the collodion negative is fixed and washed, pour over it a little albumen, taking care to cover the film perfectly; then rear it up on edge against a wall so that it may dry free from dust. When quite dry immerse it in a bath of aceto-nitrate of silver for a minute or two, so as to coagulate the albumen; and then, after a slight wash, place it in a bath of hyposulphite of soda, in order to destroy any silver compound that may have been formed. After copious washing, the picture may be allowed to dry, when it will be found perfectly protected from injury, except from the roughest usage. It will bear rubbing on the picture side without injury, and may be safely packed up in paper."

PALLADIUM.—In consequence of Professor Draper's paper, which we reported in a recent number of the "PHOTOGRAPHIC NEWS," numerous inquiries have reached us respecting this metal, and the method of preparing the chloride. Palladium is one of the metals of the platinum group, and is usually met with along with that metal in the native state. It is obtained in the pure state from the other metals with which it is associated, by a rather complicated chemical process of solution, precipitation, &c. It is ductile, and may be rolled out into thin leaves; it is as hard as platinum, and resembles that metal in colour and lustre, but is somewhat darker; it is, however, not so heavy, being only of a sp. gr. of 11·to 12; and fuses at a rather lower temperature, being just within the power of a good chemical furnace to melt. The chloride of palladium is obtained by evaporating to dryness at a gentle heat the solution of palladium in nitro-hydrochloric acid; it forms brown hydrated crystals, which dissolve easily in water, forming the solution recommended by Professor Draper, for darkening collodion negatives. A few years ago palladium was to be had in tolerable abundance (for a rare metal), at a price a little lower than that of platinum, but it has gradually been rising to an almost fabulous price, and the last time we were told the price it was dearer than gold. An alloy of silver and palladium was employed by dentists, but since the great rise in price we believe some substitute has been employed.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "PHOTOGRAPHIC NEWS," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

A COUNTRY AMATEUR.—Your best plan will be to ask some friend in London, on whose judgment you can rely, to select the apparatus for you and send it down. Advertisements are very useful as showing where the desired forms of apparatus are likely to be met with; but if you trust entirely to them without a personal inspection to see if the article advertised is really such as is required, you will generally meet with disappointment. If you have no friend in London upon whose judgment you can rely, we shall be happy to do what we can to help you if you will send a private letter stating the particulars of what you require.

A PRACTISER OF TALBOTYPE.—The greasiness will go away after the paper has been wetted with the solution a few minutes. The spots you complain of are a frequent source of annoyance in that particular sort of paper.

W. WOODWARD.—In our next.

H.—Your silver bath is not strong enough. The mottled appearance on the print inclosed is due to patches of insensitive chloride of silver on the paper; there not being enough nitrate of silver present to render the chloride equally sensitive all over.

AN AMATEUR JUST COMMENCING.—1, 2, and 3. We have not tried the process, but in any case it will be better for you to adhere to the formulæ and directions given by the inventor until you have fairly tested its capabilities. 4. Either the collodio-albumen or Fothergill process. 5. A twin-lens stereoscopic camera. 6. Impossible to say without seeing prints from them, as the value depends so much upon the subject.

P. A.—Formulæ for the iron developing solution have been repeatedly published in our pages.

J. D.—If you use a good collodion, and the bath is in order, you should have no difficulty in getting density in negatives. Add one grain of acetate of soda to the bath.

A. H.—From the description you gave we should imagine that there is some "stop" or projecting part of the mounting about the lens which prevents the field from being as large as the ground glass of the camera. Spherical aberration would cause the image to be out of focus at the sides, but would not make it disappear entirely.

CADMIUM.—See vol i., p. 155.

PHOTO.—The only thing for you to do will be to try and make a mixture of colours, which, when dry, shall approach the tone of your photograph sufficiently nearly to be used to touch up the damaged portions.

NO CHEMIST.—We cannot give you simpler methods of extracting silver from old baths than we have already done in several of our numbers, both early and recent. If they are not simple enough, you should try to acquire sufficient knowledge of chemistry to be able to avail yourself of the information.

EXCELSIOR.—1. Your varnish must have been made with chloroform, the spontaneous decomposition of which, in the course of time, would give it sufficient corrosive action on your picture to entirely eat it away if it were faint. 2. It has not been recommended to add sulphuric acid to the ordinary iron developing solution, but to add sulphuric acid in place of oth acids. The addition of sulphuric acid to your solution, containing, as already does, sufficient nitric and acetic acid, has spoiled it.

NEGO.—Fix with hyposulphite of soda instead of cyanide; that will re the fading out of the picture. The peeling off is occasioned by the collo not being good. You should not pour the spent developing solution into the bottle, but throw it into the silver residues, if you keep any, or d the sink, if not. The fault of your print is that the hypo. bath is not st enough; the hypo. should also be washed out as rapidly as possible, as remains in the pores of the paper for any length of time, it will decom Your albumenised paper is very creditable for a beginner. Altoge practice and experience seem to be all that you want to become a first- photographer.

Communication declined, with thanks.—AN ADMIRER.

The information required by the following correspondents is either such we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—M. H. Y.—Achromatic.—Earnest.

IN TYPE:—D. L.—A Bathonian.—Capt. S. S. B.—Ponçon.—M. M. D.—G. H. T. T.—W. Boyer.—G. H. W.—J. Walter.—Viator.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 44.—*July* 8, 1859.

TONING WITH PLATINUM.

BY ALEXANDER WATT.

SEVERAL years ago I had an opportunity of proving the truth of the old adage—"Necessity is the mother of invention." I accidentally found myself without any chloride of gold, and having no nitric and hydrochloric acid by me at the time, with which I could have dissolved a piece of gold, and thus overcome my difficulty, I was in what is usually called a "fix"—that species of "fixing process" which photographers care least about. It occurred to me, therefore, to try whether the chloride of platinum would answer the purpose of toning as well as the chloride of gold.

Having by me a strong ethereal solution of the chloride of platinum, I made up a toning bath thus:—

I dissolved four ounces of hyposulphite of soda in eight ounces of water; I then added about 60 drops of the chloride of platinum to an ounce of distilled water, which I then poured into the hypo. solution, gradually stirring all the time, in the same way that the gold is treated when making a gold toning bath. The platinum readily entered into combination with the hypo., forming a clear solution.

I now took an over-printed proof, and immersed it in the bath, and to my great astonishment and delight, the proof, in the course of a minute or two, assumed a beautiful dark brown colour, superior in tone to any shade of brown I have ever known to be produced in a gold toning bath. It appeared to me that in two minutes the proof had acquired the maximum of coloration, for on allowing it to remain for a much longer period no apparent alteration took place. In some instances, where the proof had not been much over printed, the toning seemed almost instantaneous.

Having used Sutton's toning bath a good deal at that time, it occurred to me to make a bath, after his formula, substituting platinum for gold; and, after having well washed some proofs, as directed by him, in the process referred to, I plunged them into the newly-made platinum bath, which consisted of—

Solution of chloride of platinum, about...	30 drops.
Hyposulphite of soda	8 grains.
Hydrochloric acid...	5 minims.
Water	4 ounces.

I dissolved the hypo. in 3 ounces of the water, and dropped the chloride of platinum into one ounce of the water (this [illegible]uld be distilled water). I then carefully added the [illegible]inum solution to the hypo., well stirring. Lastly, I [illegible] the hydrochloric acid.

[illegible]*antly* the proofs assumed a rich and brilliant brown [illegible] of a beautiful tone. I then fixed the proofs in a [illegible] solution of hypo. and the whites became at once per[illegible]clear, whilst the general tone of the proofs did not, as [illegible] can remember, undergo any evident alteration.

[illegible]r having made repeated experiments with the platinum [illegible]g bath referred to, in various ways, I felt quite satisfied [illegible] with this bath it is possible to obtain brown tones far [illegible]e beautiful than any shades of brown which can be obtained in a gold bath.

I did not find that by leaving the proofs for any longer period in the platinum bath, the tone would alter from brown to the shades of purple or black, as in the gold bath, and I am inclined to think that such would not be the case.

I have been desirous of conducting these experiments again, with a view to lay before the photographic world some *quantitative* data, which would prove whether or not the platinum bath is more economical in use than that prepared with gold. My impression is that with care, and by using a bath soon after it is made *until it is fairly worked out*, it will prove to be an inexpensive one to work, especially if photographers make their own chloride of platinum.

Amongst the many experiments which I made with platinum was the following:—

In the place of hypo. I employed a few grains of cyanide of potassium in the new toning bath, and I have a proof by me which I took from the pressure-frame, toned and washed it in several waters (one water being warm), ten minutes altogether, and this proof has been exposed more or less to the influences of the atmosphere and light ever since, without apparently having undergone any change. This was done fully three years ago.

After observing, practically, the effects which the platinum produced upon the reduced chloride of silver on the proofs, I began to reflect a little upon the theory of the subject, and the following deductions occurred to me at the time.

I had for some years observed that when an ethereal solution of chloride of platinum was placed in contact with a surface of silver, it immediately darkened the surface, and, as the ether evaporated, a film of reduced platinum was deposited upon the silver, which would attach itself so firmly that it would require good hard rubbing—although the layer was necessarily exceedingly thin—to remove it. This, I argued, would favour the permanency of proofs toned with platinum, for in these we have a silver surface, to which, in the process of toning, the platinum attaches itself. Now, as platinum is, of all metals, the least likely to be affected by atmospheric influence, or by light, or even by any hypo. which may be left in the paper from under-washing the proof, I think that proofs toned by it will be more likely to be permanent than others toned in any way. Of course this is merely an opinion. I acknowledge that I have not yet sufficiently tested the peculiarities of the process, owing to the fact that my time has generally been most fully occupied when I had the greatest desire to renew my researches.

If any of your numerous readers should feel disposed to try the platinum toning bath, I should recommend them to proceed thus:—Owing to the quickness with which the bath tones, it would be advisable, I think, either to wash the proofs first, or to fix them in a plain hypo. bath, 4 ounces to 8 ounces of water, and then to wash them a little before placing them in the toning bath, when I have no doubt the tone will be acquired almost immediately after immersion. But this, I believe, will depend upon the amount of platinum in the bath; therefore, when time is an object, I would recommend employing plenty of the chloride, which, although it will augment the speed of the operation, will not involve much greater cost, for I do not conceive that the reduced silver upon the surface of the proof is capable of attracting, if I may use the term, more than a certain quantity of the metal from the toning bath, whether it remains in the bath up to the time that the picture is toned, or for a week afterwards.

About two years ago, I called Mr. George Knight's attention to this new toning bath, but I have not yet had an opportunity of hearing what success he met with.

Should any of your readers turn their attention to this subject, I shall be most anxious to hear the results of their labours, and I do hope that they may derive some advantage

from the process, which, with a little care, I have no doubt they will do.

In conclusion, I may remark that I had intended long since to have made known the above process, but other matters have prevented me from doing so.

PHOTOGRAPHIC COPYRIGHT.

On the subject of Photographic Copyright there has been recently a most important case decided, and the following able remarks on the subject we extract from the *Athenæum*, as they may not prove uninteresting to our readers:—

THE DEATH OF CHATTERTON.

An important and interesting trial of copyright in the Rolls Court, Dublin, came to a second hearing on Wednesday, last week, in which Mr. Wallis's picture of "The Death of Chatterton" played the principal part. The facts, as stated in the petition and by the counsel, were these:—

The original painting was first exhibited at the Royal Exhibition of Arts, in London, in the year 1856. It was purchased by Mr. Augustus Leopold Egg from the artist. There was an agreement whereby Mr. Egg sold to Mr. Turner the right to engrave the picture, with liberty to exhibit it for the purpose of obtaining subscribers. The only permitted publication of the engraving of the picture was in the *National Magazine*. In the month of April the picture was carried over to Dublin to be exhibited. The picture was known as "The Death of Chatterton," and so entitled by Mr. Turner. Now, this title was assumed by Mr. Robinson, a dealer in photographs, and an advertisement published by him stated that he would have "the beautiful stereoscopic figure of the last moments of Chatterton" ready for sale on the following Monday. Mr. Turner, believing that such an advertisement would injure his property, applied to Mr. Robinson to discontinue the sale. Mr. Robinson refused to stop his publication, on the ground that his stereogram was not copied from Mr. Wallis's picture, but was an independent study from the biography of Chatterton. Hence the application to the Rolls Court for an injunction to restrain. At the first hearing, which took place in May, the injunction was granted, Mr. Robinson submitting until an affidavit could be framed. He came before the Court with an affidavit, stating that it is impossible to take pictures for stereoscopic slides from a plain surface such as a picture. Last week he also affirmed that in March of the present year he made arrangements for a series of stereoscopic pictures, illustrating the life of Chatterton, such as his Meditations in the Muniment-room of St. Mary's, Redcliffe, writing his last letter to Walpole, &c. The series was completed, with the exception of Chatterton in the Muniment-room. Having seen the painting, and studied the works which gave an account of the poet, he made arrangements to produce these illustrations. He constructed in his establishment in Grafton-street a background scene of London from a painting upon canvas, by a clever artist, and so disposed a figure as to represent the dead poet. His advertisement intimated that the stereogram of the death of Chatterton was from the "living model." An affidavit was put in by Mr. Wallis, in which he stated that his picture was original, and that he had not copied from any one. An engraving was produced, and handed up to the Court, from which it was alleged the artist had derived his idea of the death of Chatterton. It purported to have been engraved by Edward Orme, of No. 14, Old Bond-street, painted by H. Singleton, and dedicated to the Marquis of Lansdowne. The date of publication is given as 1st of May, 1794. Beneath the engraving are the words from Cowley—

> "Behold him, Muses, see your favourite son,
> The prey to want ere manhood has begun,
> The bosom ye have filled with anguish torn,
> The mind ye cherished drooping and forlorn."

The engraving represents a garret and miserable bed—Chatterton reclines upon the pallet in a dying state; his head lies at the right side of the picture, the shoe is on the right foot, the other shoe is off; a phial lies on the ground, manuscripts are scattered about, a chest containing papers lies open; on a small table books are seen, and also a candlestick, the extinguisher being on the candle; three pens have been carelessly thrust into an old ink-bottle; upon the wall a caricature or grotesque face has been drawn with chalk or cork. At the door stand a woman and child—the former being the landlady of the house in which Chatterton died. Her face exhibits surprise and terror. It was not contended that Mr. Wallis had copied Singleton's picture, but that Mr. Robinson had. Counsel contended that Mr. Turner's title in the work was incomplete; Mr. Wallis not being at present a party to the suit. After a long argument on each side, the Master of the Rolls said, that whatever the ultimate difficulties of the case might be, there was no question as to what he was bound to do at present. With respect to the alleged failure of Mr. Turner to prove his title, the documents which had been laid before the Court showed that he had a title; that was, if he stated it correctly, and the objection at present was that the petition most certainly did not state it correctly. It was clear to him that there ought to be an amendment in the petition; that the facts should be accurately stated, and that Mr. Wallis should be made a party to the suit. It was quite plain from the importance of the question at issue that the injunction should be continued until the hearing of the case. Suppose that Mr. Wallis had never sold this picture, but exhibited it at Mr. Cranfield's for the purpose of engraving, would he in that state of facts have a right to sue? He had a very strong opinion (though he admitted the question had never been the subject of decision) that the painter had, by common law, the very same protection which the author of any work enjoyed previous to publication. Surely nothing could be more unjust than to say that if a painter gave the public the privilege—and a very great privilege it was in some cases—of allowing them to see a work of art in his studio, a person who had thus inspected the picture, having a good memory, and being an artist himself, would have a right to endeavour by some contrivance to make a copy of that work; for instance, by getting his apprentice, as was done in the present case, to dress himself up in a peculiar manner, so as to represent the principal figure in the painting, and then taking a photographic representation of the subject composed in imitation of the picture, and representing it in terms by advertisement as a copy of the picture. This had been done in the present instance—the photographic pictures sold by the respondent having been advertised in the newspapers as "The Death of Chatterton." He looked upon this as nothing short of a fraud—a deliberate fraud; and he had not the slightest difficulty in holding—on the principle laid down in the case of Prince Albert *v.* Strange, which was the principle of common sense, and in the admirable judgment of Mr. Justice Erle in the case of Jeffrey *v.* Boosey—one of the ablest judgments that had ever been delivered—that it would be the bounden duty of a court of equity to interfere in such a case, quite irrespective of the common law right of the painter to sue for damages, which right he would have as long as he had not published the picture. The question then arose whether there had been a publication of the picture: because, if there had, then considering the principle laid down in the case of Jeffrey *v.* Boosey, it would be very questionable what the law might be. He had no hesitation in saying that the exhibition of the painting at the Royal Academy was not such a publication as would deprive the artist of his right. It was a qualified publication—it was a privilege allowed to [illegible] public to see works of art. Did any one suppose that if [illegible] Walter Scott read out one of his productions to a numb[illegible] his friends, and that one of them had such an accurate m[illegible] that he could reproduce every word of it, or that some [illegible] was in a corner taking notes in shorthand—did any one [illegible] that in such a case the reading of the work would amou[illegible] publication so as to give the person who had taken note[illegible] at common law to bring out an edition of the wo[illegible] analogy to that case the exhibition of a picture at th[illegible] Academy, or at Mr. Cranfield's, or elsewhere, for the li[illegible] pose, would be nothing more than a qualified publication[illegible] would not deprive the painter of his remedy at common [illegible] in equity prevent a party from the commission of a fr[illegible] attempting to copy the picture. A difficulty, however, ar[illegible] as to the third point—namely, that there had been a publica[illegible] in the *National Magazine*. But for that publication, th[illegible] would not be any serious doubt in this case. He was not prepared to say, nor did he wish at present to offer an opinion on the matter, what was the effect of that publication in the *National Magazine*. If the respondent had simply confined himself to copying that engraving, it was questionable whether the petitioner would have any cause of action against him.

But he had not confined himself to merely copying the engraving; he had undoubtedly used it in the preparation of the photograph, but he had also adopted the colouring of the picture for the purpose of inducing the public to believe that the photograph was taken from the picture itself. He thought this was a fraud; he did not use the word in an offensive sense, but a fraud in contemplation of a court of equity. He might entertain some doubt as to whether the photographic pictures produced by the respondent would be a serious injury to the owner of this valuable painting; but if this were overlooked the photograph might by a very easy process be enlarged to the size of the original, and thus an unimportant piracy might be followed up by the adoption of another mode of piracy which would be most injurious to the owner of the painting. His Honour concluded by saying that he would continue the injunction.

PHOTOGRAPHY AT THE SEAT OF WAR.*

(From our Own Correspondent.)

THE priest came in to tell me that the Austrians were in motion, and proposed that we should go together, as he had a brother at Torrione, about whom he was in some alarm, and with whom he proposed we should stay a few days, as we should not be farther away, in the event of a fight, than if we remained where we were, and would, besides, be in all probability out of the line of march of the troops. I was so tired of the idle life I had been leading, that I gladly accepted his proposal; disinterred my camera and other impediments, and packed them on my mule, and found it viciously restive from its long rest in the priest's stable. I may mention as a rather curious fact, that in all the requisitions made by the Austrians, the priest's house and property were spared. Whether they acted on the supposition that a priest could have nothing to be deprived of, or on superior orders to respect the clergy, I can't say, but, certainly, the effect was advantageous as far as I was concerned, for had it been otherwise, I should most assuredly have lost my mule.

Having finished strapping on my packs we mounted on our respective animals, and commenced our journey to Torrione. We were a good while on the road, in consequence of being obliged to make a circuitous route so as to avoid passing through Vercelli, and at the same time not to cross the line of troops. There was one advantage attending this, however, which was, that it enabled me to see the condition of the country on three sides of the town, and to judge for myself whether there was any truth in the statements made by the Piedmontese newspapers—for I see these, although I cannot by any possibility meet with an English one—and I am bound to say that it is using too mild a term to say that these statements are gross exaggerations. Some of the fields very close to the town appeared barren of crops, but I could only see them from a distance [illegible]ith my glass, and it is possible that this may not be caused [illegible]the troops—but farther away the crops looked as flourish[illegible]s in any English county, and everything appeared as [illegible] and orderly as in a Yorkshire vale; and little children [illegible]olling about in front of the cottages, and, although so [illegible]peaking the mongrel kind of Italian, which they call [illegible]anguage, with a fluency which it would have [illegible]ed Mrs. Partington to hear; and not a single [illegible]on visible that an enemy had been or was near.

. . . .

[illegible] next day, when it was certain that the Austrians [illegible]vacuated Vercelli, I, my friend the priest, and his [illegible]r, resolved on paying the place a visit. We found [illegible]reets filled with litter of all sorts: dirty straw, pieces [illegible]wood, bottles, broken and otherwise, bits of leather, and [illegible]gs abounded; in fact, they were in a very dirty state [illegible]ndeed; a slight aggravation, probably, of their normal condition. A good many of the windows of the houses were broken, and the general appearance of the houses themselves suggested the idea that they had been out on the loose for some time and had not yet recovered; that they were a kind of architectural prodigals, who had been indulging in riotous living and had become considerably dilapidated in consequence; otherwise, they presented no appearance which would induce me to suppose that they had been recently occupied by a hostile army. As we rode along the street the people who were indoors came out, and those who were lying about on the ground got up and looked at us with great curiosity. I imagine they took me for one of the enemy, and had doubts whether my presence did not indicate their return, for I heard several of them asking questions of the priest as to who I was. The respectable portion of the people were indoors I imagine, for those I saw in the streets were very far from inspiring confidence by their appearance. The faces of the men generally had a dissolute, unsettled expression, and I remarked a peculiar, bold expression in the eyes of the women, which struck me as having been possibly communicated to them from the residence of the troops in the town.

We dismounted in an inn yard, which under ordinary circumstances would, I dare say, have been respectable-looking enough, but at present had the same disreputable look as the other houses. The landlord was sitting on the step with his hands in his pockets, and puffing away at a fat cigar with all his might, the thing, I suppose, being home-made, and difficult to draw. He was a black-bearded, swarthy fellow, and seemed good-natured and obliging. As soon as we entered his yard he got up and shouted for somebody, and then, with our assistance, put the mules in the stable.

While we were in the room I took up a Turin newspaper, and from it I learnt for the first time that at least one English newspaper had got a correspondent with the Austrian army, but the paragraph which conveyed the information was not very gratifying to me as an Englishman; it began:—"*Ecco che abbiamo un inglese, il quale pensa che i poveri piemontisi non sono abbastanza spogliati dagli Austriaci senza la sua assistenza;*" and went on to refer to the said correspondent having taken a private carriage for his own use by force to convey his luggage from Vercelli, and of what he would receive for such an action if he got his deserts, and a good deal more besides. I felt sure when I read it that the charge could not be fairly stated, so I called to the landlord and asked him if he had heard anything about it, and found that the carriage was actually his property, and the account he gave me of the affair threw a very different colour on the transaction. His statement was rather a long one, but in substance it amounted to this:—"That he was asked in the first place to lend the carriage, but fearing that if it left the town with the Austrians there would be very little chance of his seeing it again, he refused; that, thereupon, it was taken against his will, but was afterwards sent back, together with a very fair price for the hire of it." Such is the true history of a transaction which may have been translated from the Sardinian papers into the English journals in all its original blackness.

We wandered all over the place during the remainder of the day, I marking the places of which I proposed taking a picture, and which were chiefly interesting as memorials of a town which had just been abandoned by the enemy.

These negatives, I mention by the way, were almost failures; they are not so bad as to prevent my using them, but the prints will be indifferent; I can detect specks in the deep shadows, and a want of definition in the half-tones. I attribute this to the agitation which the collodion and other chemicals had undergone during the journey, and I am sorry that I did not use the dry plates on this occasion. I am not very strongly attached to the dry process, and would never adopt it while I could use the wet, because I have never been able to obtain as good results by its means as with the wet collodion; but at the same time I can readily believe that the prepared plates have an actual advantage when one wants to take a picture immediately after or during a rapid journey on a mule's back. A journey by railway does not improve the working properties of collodion, but such travelling is perfect immobility as

* Continued from vol. ii. p. 197.

compared with the trot of a mule; and on this occasion we had pushed along pretty sharply in spite of the heat, in consequence of the padre's anxiety on account of his brother. . . . .

Vinzuglio.

I have just returned with my camera and three negatives from Palestro. I had taken five, but a stupid Piedmontese soldier came and lifted up my tent, and thrust his head and shoulders in, knocking down a couple of them which I had stood up to drain, and completing their destruction by laying hold of them with his clumsy paws and rubbing away half the film. I will send you proofs of these as soon as I have an opportunity of printing some. They will not be quite like what I hoped to send you. You will see many dead bodies scattered about among the trees, and many lying side by side ready to be thrown into the hole in which they will be interred as soon as it has been dug, but no bodies of men in actual conflict; I felt it would be absolutely impossible to get near enough to pitch my camera, though I was myself able to see the fight distinctly from beginning to end.

At Torrione the night preceding the battle, nearly everybody was in the street expecting every minute to hear the report of guns, as we knew that the French and Sardinians had got as far as Vercelli in considerable numbers, and also that the Austrians were in the immediate neighbourhood, at the place in which I am concluding this letter among others, and which is not more than four miles from Vercelli. Every now and then one or two would get so impatient that they would walk in the direction of the town to see if they could hear anything of what was going on. I tried to get some sleep, intending to start as soon as it was light to see if there was any sign of a battle being fought, or if the Austrians had continued their retreat.

There was no time lost after the sun rose in preparing to get away. I threw my glass over my shoulder, put a piece of bread in my pocket, and was off with the padre, his brother, and four or five others. We took the direction of Palestro, and pursuing our way across the fields, it was not until we had got near it that we approached at all closely the allied troops. We first came upon a strong force of Sardinians marching along the road towards Confienza, and remained standing in the field beside the road until these had passed. The appearance of the men and their bearing were such as to inspire confidence in them. The expression of their faces was resolute and determined, though different. Some were smiling, and stepped out with an air of eagerness, as if they were going to a dance instead of a fight; others seemed deadly pale by comparison with the swarthy faces about them, and these were not the least resolute looking. It sent a thrill through me as they went marching by, entirely silent as regards voices, and giving no sound but the regular tramp, tramp, mixed with the rattling of the scabbards of the cavalry, and the jingling of the accoutrements of the horses. There is something wonderfully impressive in the sound of the marching of a body of armed men, and yet it is not because they are armed, for I afterwards saw bodies of men moving towards each other to engage in actual combat without any similar feeling, but they were at a distance, and I could only see and not hear anything beside the reports of the guns; but to return. As soon as the road was sufficiently clear, we crossed over and continued our way across the fields, regulating our progress by the march of the troops, which we could now see moving towards Palestro in considerable numbers. With my glass I could distinctly see the Austrians in the last-named place, and as it was evident that the battle was to be fought there, we made our way to a little group of tall trees, up which we climbed, perching ourselves on the branches and waiting for the commencement of the slaughter. It was the most exciting time I ever spent in my life. My heart beat at a tremendous rate, not from fear, for there really was nothing to fear beyond the exceedingly improbable event of a shell bursting among us, but there was something terrible in the spectacle of bodies of men preparing to kill each other.

The Austrians were the first to begin. I happened to be looking in their direction at the moment and saw the bright flash; and at the same time that I heard the roar of the gun I saw a slight movement among a body of soldiers who were ascending the slope, and then the dirt fly up in little columns behind them until the ball came to a stop in the field. Another report followed, the troops increased their speed, and soon the air was filled with a confused sound of reports of small arms, the booming report of cannon, and the shouting of the men engaged. I was so near that I could see with my glass each individual soldier, but to describe what took place over the whole scene of the fighting is out of my power. My attention was so engrossed on one point or another that I was unable to pay attention to what was passing elsewhere at the same time. There was a large body of Piedmontese, who halted when within a short distance of the Austrians, and fired, and then dashed forward to charge with the bayonet. I could see an officer a little in advance of the foremost rank waving his sword, and his face turned rather towards them, I suppose urging them on, who was struck to the ground as if by a flash of lightning. Another dark-looking figure appeared immediately in his place; the goal was gained, there was a concussion, a confused waving of arms, mingled with rapid flashes from concealed individuals who seemed to be firing among the attacking party, who were forced back in a mass, and retired for some distance; the Austrians following them but a little way and then going back and giving place to the artillery, which re-commenced firing, and the first few balls making a complete line through the mass of troops who were mixed up together in confusion. This was the most painful spectacle that met my eye during the whole of the battle. While they were in actual conflict there was something stirring and exciting, which made one feel a longing to be among them, but to see men struck, beaten, and torn to pieces when they were in a perfectly helpless condition made my blood run cold. Fortunately this did not last long. A fresh body of troops advanced to the attack as confidently as if nothing had happened to their comrades. There was the same scene, but instead of their following the downward course of those who had preceded them, I could see them pressing closely upon the Austrians in a dense mass. The Austrians held their ground firmly and tried to force them back, but not succeeding they began to give way, very slowly at first, for those behind pressed those in front forward, but gradually the backward movement was communicated to those in the rear, and they receded more and more rapidly before the pressure of the allied troops until they were hidden from my sight by intervening objects. It was the old tale of the Chinaman—"Suppose you must come, we must go out."

Looking to another part of the field, I was surprised ... a body of Austrians almost close to our post of obser... advancing at quick step in the direction of a body of ... troops, who were facing about, and in two minut... were rushing to meet them at a kind of trot. Sev... fell on both sides when they came into collision, an... were forced into their places; those who had fall... trampled upon by both parties alternately. Some ... hand fighting ensued, the French fighting with the ... of tiger cats, and gradually compelling the Aus... retreat, not in a broken and disorderly manner, ... compact mass, which rendered it difficult to do them ... harm with the bayonet, but rendered them an easy m... the French rifles. The French troops scattered them... a little and fired into the retreating Austrians as fast as ... could load, apparently without any orders, and fighting ... the simple principle of doing the enemy as much harm ... possible. Two or three times when the French soldiers approached very closely, a portion of the Austrian troops turned at bay and drove them back a little, but the moment they resumed their retreat they were harassed anew. As

far as I could judge they lost ten times as many in this way as in the actual conflict. It was a horrible sight; the contending parties were so close to me that I could distinguish the cries of the wounded mingled with French oaths and the rattling sound of the guns as they came in contact. It was during this part of the battle that I and those with me had a narrow escape of being shot like so many ro[illegible] thick-headed Sardinian peasant, whose patriotis[illegible] his discretion, had managed to get hold of a [illegible] and thought it an excellent opportunity of [illegible] a shot at the *Tedeschi*. He was perched [illegible] a bran[illegible] the tree next the one in which I was, and had just got the gun to his shoulder when the padre's brother, who was a little above him in the same tree, caught sight of his operations, and, with an instinctive sense of the danger he was about to bring upon us, gave him a tremendous kick on the side of the head which sent him tumbling from branch to branch almost to the ground.

There was a good deal more fighting than that I have endeavoured to describe, but it was not so closely under my eyes, and by slow degrees the firing ceased altogether, and we concluded the battle was at an end. As soon as we descended to the ground, the priest proposed that we should see if we could do anything for the wounded, and of course we were all willing to adopt his suggestion. Their groans would have directed us to where they were lying, even if we had not been able to see them. You can form no conception of the sickening sensation I felt when I found myself in the midst of pools of blood, which splashed about at every st[illegible]spreading a sickening smell in the atmosphere. The bodies of the slain were lying pell-mell among the wounded, very few of whom were able to withdraw themselves from the horrible contact. We moved each in succession, and laid them gently on their backs—the dead, dying, and wounde[illegible] side, leaving them thus until the men who had gone to get some water returned with the patrols who were o[illegible] collecting the wounded. No time was lost in selecting those who were placed in the ambulance first; they were taken pretty much at random, only those who seemed actually dying were passed over in favour of those whose wounds [illegible] slighter. One of those so passed over was, I think, an Englishman. He had all the appearance of one, though he was dressed in the Sardinian uniform. I moistened his face with water, and poured some into his mouth, but he had not strength to swallow it. I got him carried down to a tent where the surgeon was operating, who was kind enough to see to him at once, but [illegible] could do nothing to save him. A bullet had passed through his thigh, severing the artery, and he had bled to death. I did all I could to make his last moments easy by [illegible]ting his face with water. . . . . He had five Napoleons [illegible] a few francs in his pocket, and round his neck there [illegible] a portrait of an extremely pretty English girl, on the [illegible] which was written, in a female hand, the initials [illegible] and the date December 14, '58. J. L.

[illegible] the abrupt manner in which this letter concludes, [illegible]e it must have been sent to Turin by some unex[illegible] opportunity.—ED.]

[illegible]ECENT CONDITIO[illegible] OF THE ATMOSPHERE.

[illegible] number we published an interesting communica[illegible] Mr. Hardwich on the subject of the influence of [illegible]dition of the atmosphere on the quality of the nega[illegible] This is a subject well worthy of consideration, and it [illegible]le that if a series of observations were made and [illegible], it might be possible for a photographer to obtain [illegible] pictures under every aspect of the weather, by varying compound chemicals according to c[illegible]stances. The [illegible]owing, relative to a peculiar condition of the atmosphere [illegible] certain season of the year, is [illegible] from *Cosmos*:—

"At the present moment, [illegible]lly extraordinary phase of atmospheric pertubations, remarkable alike from their violence as from their extent. Hardly a day has passed, during the last fortnight, that a heavy storm has not raged in London, as in Paris, in Milan, in the Jura, and the most widely separated districts of France. The most observable thing in these storms is that they are renewed every year at the beginning of June. How can we explain these grand phenomena? No doubt the epoch of the year, comprised between 15th May and the 30th June, is the epoch when vegetation is most rapid, when evaporation is most abundant, when all the sources of electricity are in full activity, when the atmosphere is likewise in a condition favourable to the accumulation of electricity. It may be conceived, therefore, that if a storm bursts at the end of May, or the beginning of June, the disturbed equilibrium is re-established very slowly, and that storms may succeed each other during many days, a month, or even forty days; and this might be the foundation of the old adage relative to St. Swithin. We do not think, however, that these relations are sufficient to explain everything; we are decidedly of opinion that the intervention of another and much more important cause is necessary, which has been too much overlooked hitherto. In his communication relative to coloured shadows, M. Babinet said, 'The 27th May the sky was entirely veiled by a fog, which did not allow a glimpse of blue colour to be seen.' We had made the same remark, and had, moreover, noted the fact that, for a fortnight, the sky had been grey, and never of an azure blue, and that its depths were invaded by a kind of dry fog or thick smoke. That in the morning the horizon, especially towards the west, was alarming to see, it was so totally devoid of all transparence.

"Is this state of the atmosphere abnormal, observed for the first time in June, 1859; or, is it a constant periodical phenomenon which has often passed unobserved because the attention of meteorologists has not yet been sufficiently awakened? We put that question to ourselves, and we were far from foreseeing that the power of resolving it would be so soon given us, when, on the one hand, the recollection of a paper, forwarded to us by M. Goldschmidt last year, recurred to our memory, and likewise the reading of M. Coulvier-Granier's researches on meteors suddenly opened our eyes. 'If,' wrote M. Goldschmidt, 'the dry fog is rarely observed at Paris, it is because men occupy themselves there but too little with what passes in the depths of the atmosphere. A fog of this kind enveloped Paris and its environs on the 6th June of last year, and I find in the meteorological table of M. Heiss, the celebrated observer of Munster, that the fog was likewise very dense in that town from the 2nd to the 7th June. At Paris it coincided with a north-east wind, and was accompanied by an intense odour of sulphur or creosote (the same odour was very sensible on the 27th of last month); the atmosphere gave evident signs of electricity, and at Munster the ozonometrical paper assumed a very deep tint. I have ascertained that, for many years past, the same facts have often recurred at the same epoch; I have even thought of addressing a memoir on the subject to the director of [illegible] observatory.'

"In the following lines we faithfull[illegible] the substan[illegible] M. Coulvier-Granier's observations, a[illegible]e document[illegible] has collected on the subject:—

"The dry fog of 1783, which extended over the who[illegible] Europe and other parts of the world, invaded the atmosphere from the 27th May to the 15th June; the not less celebrated fog of 1834 also continued from the latter end of May for some days in June; and we may say, generally, that the dry fog makes its appearance usually in June. When it appears, the azure of the sky becomes dull, or rather it is grey, even in the entire absence of clouds; the sun has a reddish tint; distant objects are effaced from view, or are only visible through a veil of vapour, a part of the shooting stars, which ought to be seen, escapes from sight. Every year this greyness [illegible]e sky is visible, sometimes its duration is short; at other times, on the contrary, it acquires consistency, becomes more dense, and extend[illegible] very distant regions. At the

instant when the transparency of the atmosphere ceases, the regions of cirrus contain, in much greater abundance, the gases or other matters to which they owe their existence; hence the fog which renders the sky grey, takes its rise in the elevated layers of the atmosphere at the height of the cirrus, the aurora borealis, and possibly the shooting stars; it is not impossible that it may even take its rise in the ethereal regions, from whence it descends to the earth, collecting, in its passage through the inferior zones, that which gives it the consistency necessary to render it visible to our eyes. This kind of fog is, at times, highly electrical. . .

"It is, therefore, a well-ascertained fact that the dry fog is a very common phenomenon at the end of May or beginning of June, the period signalised for a long time past as being fertile in intense or prolonged atmospheric perturbations, storms, aurora borealis, &c., and it appears to us impossible not to admit that there is, between these two phenomena, the relation of cause and effect. Let us add, finally, though with some timidity, that June is six months distant from November, the month of the periodical appearance of shooting stars in considerable numbers. In November the earth is near its perihelion, in June it approaches its aphelion; will it be in relation, at these two phases of its annual revolution, with the layer, or the great ring of cosmical matter, the existence of which, round the sun, is demonstrated by so many other facts? Will the first passage be marked by shooting stars, the second by dry fog? M. Babinet has, for a long time, been trying to ascertain if he could not, about the month of June, see, during the day, shooting stars pass between us and the sun; we have ourselves watched the heavens for the same purpose. Now that which we were seeking at a distance and in vain, might it not have been close to us in the form of a dry fog, obscuring the sky, rendering it grey, depriving it of its transparency, and liberating the electricity by friction, the origin of the frequent and terrible storms of the latter end of May and the beginning of June?

"We will go no farther; perhaps even we should fear to have gone too far already, if we had not had for our sole motive the desire of stimulating the ardour of our readers, to bring from them communications relative to the result of their observations, which we shall be very happy to receive and to subject to analysis. There is evidently, in the direction we have indicated, some important discovery to be made, some grand law to formularise."

There is a reference, in the above paper, to the presence of a strong odour of sulphur during some of the recent storms; it will be of interest to those photographers who employ rain water, instead of distilled water, to know that the presence of sulphuric acid in this water has been ascertained beyond a doubt.

POSITIVES WITHOUT THE EMPLOYMENT OF SILVER.

BY M. POITEVIN.

The author has shown that light acts chemically upon a large number of compounds, even amongst those on which no observations have yet been made, in such a manner as to cause them to assume a lower state of oxydation, that is to say, to eliminate one of the electro-negative elements which they contain. At present his object is to make known a photographic application which permits of proofs being obtained in which gallate of iron (ordinary ink) is the only colouring agent.

Make separately two solutions, one of perchloride of iron, 10 parts to 100 of water; the other of nitrate of uranium, of the same strength, and mix them together in equal quantities. Take good photographic paper (thin is preferable), and float it for some seconds on some common water, to moisten the side which is to receive the preparation. After draining it, place the dry side on a glass or dish a little smaller than the sheet, and pour on to the surface a sufficient quantity of the above mixture of the two solutions; allow it to flow over its surface several times, and pour the excess into a capsule or flask. This mixture may be kept unaltered for several days, if it is not exposed to the light.

The sheet thus prepared is to be placed to dry spontaneously in the dark. When dry it is of a tolerably dark yellow colour. It is impressed *through* the design which is to be copied; this design should be a positive, since the impressed parts of the prepared paper give the white parts. A positive on glass is the one to be preferred; but a positive proof on paper previously waxed, may also be used. The time of exposure behind the positive is from fifteen to twenty minutes in the sun, but it will vary according to the intensity of the positive; in all cases the necessary time may be judged by the colour of the paper, which from an intense yellow will become white under the influence of the light, and this decoloration should penetrate through the paper. The decolorised part is formed of perchloride of iron brought to the state of protochloride, which takes no colour under the influence of the gallic acid employed to develop the image.

In order to obtain the picture black, moisten the sheet in the first instance on ordinary water, drain it, lay it on the plate of glass, and pour over the surface a saturated solution of gallic acid, or a 2 per cent. solution of pyrogallic acid, or even a concentrated infusion of gall nuts.

Gallic acid gives, in those parts of the perchloride upon which the light has not acted, a dark violet colour. Pyrogallic acid gives a grey plumbago-like colour, similar to copper-plate engraving. A mixture of the two acids gives an intermediate colour, which can be varied by grad[illegible] the proportions.

To fix the proofs, it is sufficient to wash the[illegible] water, to renew it once or twice, sponge them, [illegible] them dry. The colour darkens in tone on drying. [illegible] obtained are as unalterable by atmosphe[illegible] as writings in common ink. This proc[illegible] double advantage of cheapness and dura[illegible] the proofs.

ON SENSITISING ALBUMENISED PAPER.

BY JOSEPH DIXO[illegible]

Those who have used albumenised [illegible] have invariab[illegible] experienced difficulties not encounte[illegible] in the use of t[illegible] paper commonly employed in photography. Albumeni[illegible] paper sensitised with the nitrate of silver, will, in the cou[illegible] of two or three days, gradually become brown. This res[illegible] is injurious to the white portions of the picture, and, altho[illegible] it may in a great measure be removed in the toning bath is always accomplished at the expense of the finer ti[illegible] Albumenised paper, more particularly, should be used [illegible] mediately after it is sensitised; but there are many [illegible] occurring in which this condition cannot be complied [illegible] Suppose, for instance, a large number of sheets are p[illegible] at once, but, before they can be used, several dark [illegible] days intervene, when the paper will be found [illegible] assumed a brown shade, and will be almost worthle[illegible] cause of this singular occurrence, is sulphur existi[illegible] albumen. The chloride of silver is readily deco[illegible] combined with organic matter, and in the pre[illegible] the gradual formation of the sulphide of s[illegible] the darkening of its [illegible]cteristic bro[illegible] verges upon a black.

After a great numb[illegible] experiments made [illegible] pose of avoiding this vexatious difficulty, I hav[illegible] the desired result by the use of the following s[illegible] paration, viz.:—one ounce of the nitrate of silver [illegible] in eight ounces of water, to which is added one dr[illegible] nitric acid; on this the paper [illegible] floated for two [illegible] minutes. It is then hung up and dried in the usual ma[illegible] and afterwards placed in a portfolio, where it may r[illegible] without deterioration for six or eight weeks. My practice is, after printing, to pass the paper through a[illegible] of chloride of sodium, which converts the free nitrate [illegible] chloride, and thereby prevents injury to the toning ba[illegible]

BALLOON PHOTOGRAPHY.

We have on many occasions advocated the employment of balloons for photographing military positions, and that the photographers who form part of the *corps* of engineers should be exercised in this kind of photography. Many months since we announced that M. Nadar, the well-known photographer, had made an ascent from the Hippodrome at Paris, and we have been recently informed that he has been sent for by the French War Minister with a view to ascertain if his services can be made available in Italy. The ascent of M. Goddard is a proof of the serious view taken by the Emperor of France of such means of ascertaining the position of the enemy.

Dictionary of Photography.

Distortion.—The effect produced on the rays of light proceeding from an object during its passage through the lens, by reason of which the resulting image is not a true representation of the object. Many of the effects of distortion are inherent in images formed by lenses having spherical surfaces, but they can, in general, be so much reduced by a skilful adaptation of the curves of the various surfaces, that *distortion* should never occur to an appreciable extent if lenses by good makers are employed, and are not used unfairly.

Dry Collodion Process.—This term is applied indiscriminately to all processes in which the collodion plate, after having been rendered sensitive in the usual manner, is prepared by washing or coating with a solution capable of preserving its sensitiveness; whether the resulting film be perfectly dry and hard, or moist and sticky.

Dynactinometer.—An instrument used for measuring the [illegible] photographic rays, and comparing the power [illegible] of [illegible] glasses. It is thus described by the inventor, M. Claudet:—It consists of a thin metallic disc, perfectly black, having a slit extending from its centre to the circumference, fixed on an axis, revolving through a permanent [illegible] disc, perfectly white. The white slit has also a slit from its centre, the exact length of the radius of the black disc; and by means of these two slits, which are so adjusted that the black disc can intersect the white disc, and by revolving, gradually cover the whole white area, the space of the white surface on which the black disc can be superposed forms itself a sort of dial which is divided into any number of equal segments, all numbered. The inventor has adopted the number of 20 segments for a large circle, inscribed on the dial, and of 8 segments for a smaller circle after the manner of the divisions of the Focimeter, but on the same plane. These 8 segments are numbered in geometrical progression, 1, 2, 4, 8, 16, 32, 64. The black disc may be made to revolve in such a manner that it shall cover [illegible] segment of the larger circle during each second or [illegible] other equal fraction of time. By that means the last [illegible] will have received 8 times more light than the first, [illegible] black disc having moved over the whole in 8 seconds. [illegible] difference of photogenic intensities are hardly observ[illegible] they follow the arithmetical progression; the [illegible] therefore constructed so that it may indicate [illegible] in the geometrical progression. The first [illegible] remains covered, in order to be represented [illegible] photographic plate and to mark the zero of in[illegible] the second is exposed to view during 1″, the third [illegible] 2″, the fourth during 4″, the fifth during 8″, the [illegible] during 16″, the seventh during 32″, and the eighth [illegible] 64″. This series, which could be extended by dividing the circle into a greater number of segments, is quite sufficient for all observations intended for practically measuring the intensity of the photographic light, and for comparing the power of object glasses. The instrument is made to move by applying the hand on a handle fixed on the back at the extremity of the axis on which the disc revolves. An operator accustomed to count seconds by memory, or by following a seconds watch, can perform the experiment with sufficient regularity; but in order to render the instrument more exact and complete, it can be made to revolve by clockwork, which gives it at will either the arithmetical or the geometrical progression. For the instrument moving by hand it is necessary that a second person should open and shut the object glass at a given signal. But in adapting before the object glass a flap connected with a cord and pulley, the operator holding the cord in the left hand can open the flap at the moment that he makes the disc revolve with the right hand, and shut the apparatus when the revolution is completed. When the instrument acts by clockwork the object glass may be opened and shut by the same means, at a signal given by a bell, which strikes at the commencement and end of the revolution. If the sensitive plate receives the image of the dynactinometer during its revolution, it is obvious that each segment indicates an effect in proportion to the intensity of light, and to the time that it has remained uncovered; also that the number of seconds marked on the first segment visible is the measure of the intensity of light at the moment of the experiment; the effect of each segment being in reality the degree of intensity which can be obtained during the corresponding time. When we want to compare two object glasses, they are adapted to two cameras placed before the dynactinometer. After having set the focus of the two apparatus, they are charged each with a sensitive plate. When all is ready, the flaps are opened at the moment that the dynactinometer commences its revolution, and they are shut when it is completed. The plates are removed, and the images developed. In comparing the result produced on each, it is easy to see which object glass is the most rapid, and in what proportion. For instance, if the arithmetical progression has been followed, and one of the plates has the number 4 on the great circle the first visible, the conclusion is that it has been necessary for the intensity of the light at that moment to operate during 4 seconds, in order to produce an effect in the camera obscura; and if on the plate the first seven segments have remained black, and the eighth is the first on which the light has operated, the conclusion will be that the object glass, which has produced the effect on the first plate, has double the photographic power of the other. But if the geometrical progression has been followed, the same experiment will show the image of the segment No. 3 represented on one plate, and that of the segment No. 4 on the other, as having each the first degree of intensity, and we have only to draw the same conclusions as regards the power of each object glass. In all experiments with an instrument of this kind, it must be remembered that the conclusions will only be exact on the supposition that the two plates were endowed with the same degree of sensitiveness, for if they had not been so endowed the difference might be due not to any difference in the power of the object glasses, but to inequality in the sensitiveness of the plates. Consequently, the experiments should always be repeated several times, and the *mean* result taken.

Effervescence.—A kind of ebullition or commotion in a fluid, which takes place when part of it flies off in the form of gas, escaping in innumerable small bubbles.

(To be continued.)

The Amateur Mechanic.

GUTTA PERCHA—*(continued)*.

If gutta percha be adulterated with any of the mechanical impurities we have described, it will be, for the most part, useless in the hands of the amateur for any photographic purpose, except, indeed, such as involve no need for purity or for strength. The only mode of purifying it from matter of this kind, would be much too expensive to render it generally

available. By dissolving it in bi-sulphide of carbon or chloroform, or even in benzol, carefully filtering, or in some cases simply decanting and evaporating the solution, gutta percha in the purest form would be obtained, no matter what amount of foreign matter might have been present; but this is obviously a process too troublesome and expensive for ordinary purposes. If water be the only deleterious matter present, a very simple and ingenious method of getting rid of it has been suggested by Mr. Saug, to whom, for many clever practical hints on the mechanics of photography, our readers are indebted. The mode he proposes is to collect the various pieces of gutta percha to be purified, and after forming them into a cake by means of heat, to cut this cake, with a carpenter's plane or otherwise, into fine shavings, a few of these shavings are attached to a wooden spit suspended before a fire, and kept in motion by means of a roasting jack. Then gradually, as the gum becomes softened, the water it contains is evaporated, fresh shavings of the article are thrown on from time to time, and at once attach themselves to the softened and dried mass, until the whole is gradually freed from its moisture, and ready in a plastic condition either for immediate manipulation, or to be preserved for future use. Great care must be used in doing this that the heat never rises beyond 240° Fahrenheit, or there will be danger of the gum melting and its quality being injured, becoming, in fact, partially decomposed.

Before quitting this part of the subject relating to the impurities and injurious action of gutta percha, it may be important to make one or two remarks which will be of service to the purchaser of manufactured gutta percha articles. In purchasing a bath for nitrate of silver, it will be wise to give the preference to a *moulded* article rather than one simply made by joining the sheet, for this reason, the process of moulding, as we have seen it conducted, is managed by means of hydraulic pressure; we do not remember, at this moment, the number of tons to which the pressure is equivalent, but it is sufficient to render it almost a certainty that all water must be expelled from the plastic material. As regards those joined by hand, of course no such elimination of water previously existing in the sheet could take place. Another fact should be remembered prior to using gutta percha articles, in manufacturing this material, a solution of soap and water is used for preventing it, whilst in the plastic state, from adhering to the moulds; this, of course, requires carefully removing. The best plan is always to wash them thoroughly with a strong alkali, say caustic potash, and afterwards rinse them with dilute nitric acid, and lastly with distilled water. Finally, for the purpose either of obtaining perfect assurance of the absence of all danger, or for rendering available vessels of doubtful purity, it has been found useful to coat the interior with a varnish of shellac. For this purpose the ordinary lac varnish would be too thin, unless several coats were applied, and in doing this there is some slight danger in applying the second coat of disturbing the first; it is desirable, therefore, to have a much thicker varnish—one part of shellac in three or four of alcohol, or of methylated spirit, which will do quite as well, and is much cheaper, will make a good varnish for the purpose. The vessel should be carefully cleaned and dried, and the varnish applied with a brush, or poured into the vessel, inclining it every way until all parts are covered, and then pouring out the residue. This should be done near a fire, for the double purpose of preventing the varnish from chilling, and of causing it to set rapidly, so as to secure it from catching dust. This varnish would be of no service for a vessel to be used for holding acetic acid, as shellac is acted on by this acid, as well as by mineral acids and strong alkalies.

Gutta percha is procurable in sheets of almost any thickness, from what is called satin tissue, an article little thicker than goldbeater's skin, to an inch thick. The most useful form for the amateur's manipulation is in sheets from one-eighth to one-sixth of an inch thick. It is, of course, sold of different qualities, that is, having undergone different degrees of purification. Where the amateur has opportunity of ordering the kind he wishes, he should ask for it of the best quality, *strained*, which will describe that which has undergone the utmost mechanical purification of which we have already spoken. He will then be prepared to proceed to the manipulation of any article he may require, the mode of doing which we shall describe next week.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 5th July, 1859.

WHEN alluding, a few weeks ago, to the present fearful war in Lombardy, I spoke of a new topographical apparatus, invented by M. Porro, and promised your readers a description of it. This instrument is really wonderful, both as regards its power and the simplicity of its construction. The only great difficulty—which, however, is now completely v[illegible]—consisted in manufacturing an objective for [illegible] which I am about to give a description. M. [illegible] to undertake a considerable amount of mathe[illegible] to enable him to manufacture this objective [illegible]sed of three differently refracting media, each [illegible] nicety. He cannot give any details as to its c[illegible] until his patent is taken.

[illegible]ment, which I saw yesterday for the first time and with which I was much struck, was executed by order of the Piedmontese Government, and will soon be on the field of battle. The following description is given in M. Porro's own words:—

"I.—Two or more cylindrical (panoramic) perspectives of a country, a field of battle, &c., being given, we can, by very simple and rapid operations made in the house draw out the plan and the *relievo* of the ground, that is, make a topographical plan and describe the curbs of [illegible] levels. The use of special scales for heights and [illegible] renders this work much easier.

"II.—Photography, as it is practised at the pre[illegible], gives us plain perspectives, which are agreeable [illegible] the eye, but whose geometrical dimensions are [illegible] the phenomenon of aberration: it is as much as [illegible] if these perspectives are geometrically [illegible] embrace, at most, 10 degrees of the circle. [illegible] therefore, the entire horizon of a country, it was necessary to take about 40 photographic proofs—a thing which would be quite impracticable in face of the enemy, and in any other circumstances far too tedious [illegible] complicated a series of operations.

"III.—To take a panorama rigorously exact, without any deformation whatever, of the whole horizon, in [illegible] proofs, by an operation that can be accomplished in a few minutes. . . . .

"No manipulations to be made upon the field. .

"The apparatus to be of a very small volume, capable [illegible] every transportation and rapid action. . . .

"Such were the problems that I resolved to endeavour [illegible] solve, and that, I am happy to say, I have solved comp[illegible]

"IV.—The solution of this topographical proble[illegible] sists:—

"1st. In an objective glass extremely conve[illegible] spherical—formed of three different media, each [illegible] proper refractive power, calculated by the method [illegible] published last year.

"2nd. In a cylindrical camera constructed esp[illegible] the purpose, and furnished with a magnetic needle [illegible] level, screws to level it, &c."

[This camera, which is circular, is hardly [illegible] quarter in diameter, and about half a f[illegible] objective is placed in the centre, and forms [illegible] circular box. A metal cylinder falls over [illegible] this cylinder is lifted when a view is taken. [illegible] objective on the border of the box, shut in by two doors, and occupying one-third of the circumference [illegible] camera, is a striped glass, behind and against which [illegible] the photographic paper. On each side of the objective [illegible] reel. From one of these reels the photographic paper [illegible] unwound, whilst it is wound on to the other—in pa[illegible] from one reel to the other the paper moves behind the [illegible] against which it rubs.]

"3rd. In the use of dry waxed paper that can be [illegible] served according to processes already known. . .

"V. The sensitised paper, in form of long bands not quite half a foot wide, is wound upon reels, and each reel is enveloped in a case which shields it from the action of the light. Each reel can, moreover, take enough paper for fifty proofs.

"One of the reels being thus charged with photographic paper, the side openings of the apparatus are closed and the operator starts off. On arrival at the field where work is to be done, the instrument is stationed as an engineer's compass or a theodolite. When placed in a proper direction, the objective is uncovered and a view is taken. The objective is then covered by allowing the metal cylinder to fall. That portion of the paper which has received [illegible]sion is wound on to the second reel, at the [illegible] first reel gives off a corresponding quantity [illegible] The instrument is then turned one-third of [illegible] its axis and another view is taken. A third [illegible] the whole horizon—north, south, east, and wes[illegible]

"A series of lines crossing one another at [illegible] are engraved upon the glass, which forms the focal support for the paper. These lines have between them an interval of five degrees each way, vertically and horizontally; an impression of them is taken on every negative at the same time as the view. In this manner any inconvenience from a shrinking or other deformation of the paper during development and fixation is obviated. Three small scales of a spiral form mounted under as many lens, permit us to measure on the photograph itself the dimensions, distance, &c., of objects, and to take thus, without the aid of a compass, all the necessary measures for the construction of a complete topographic plan.

"When the proof is to be examined it is placed upon a flat glass, underneath which is a mirror to light it up; in this position it is examined with the magnifying glass, and by means of the scale of measure, the dimensions, distances, &c., noted down.

"The paper may be prepared and sensitised a long time beforehand; and after it has received an impression, the development and fixation processes may be deferred, if necessary, for many days."

M. Porro invented this beautiful instrument principally for military purposes, but it can easily be applied to all kinds of engineering, surveying, construction of railways, roads, canals, &c., &c. My friend, who has had many a hard day's work with the theodolite and the level, tells me that with his new instrument he can perform in a few minutes determinations in the field which have often demanded many days of fatiguing observation with our ordinary engineering [illegible]struments.

[illegible]he *Cosmos* speaks of a M. Richebourg who has dis[illegible]red a method of taking vertical photographs, such as [illegible]ings on ceilings, &c.; but the process is not described. [illegible] know yet is that this photographer has taken in one [illegible]roof an image of the large painting by M. Burloff, a [illegible] artist, which decorated the cupola of the church of [illegible] at St. Petersburg.

[illegible]king of M. Nièpce's experiments concerning the [illegible]on of light," the same paper, after repeating some [illegible]ich I have already alluded, states that M. Nièpce [illegible]or had made, with his tartaric acid paper, rather [illegible]plication, namely, that of ripening grapes!

[illegible]oaked in tartaric acid is one of those substances [illegible] M. Nièpce's phraseology, "absorb and retain light" [illegible]ost facility. This light, absorbed and retained, [illegible] chemically active for some time, as all your readers [illegible]ware. Now, M. Nièpce, according to the *Cosmos*, [illegible]rts that if a bunch of grapes is placed in a paper bag, for [illegible]stance, which has been submitted to the tartaric acid solution, not only will these grapes ripen sooner than others that are not placed in these favourable conditions, but, moreover, the quantity of sugar they contain will be augmented. It is possible, it is probable, but it remains to be proved.

M. Pisani relates to me an experiment which proves undoubtedly that, by the action of light upon iodide of silver, a certain amount of iodine is set at liberty. A dissolution of iodide of starch is made. This solution, which is of an intense violet colour, becomes white when nitrate of silver is added to it. M. Pisani has based upon this phenomenon an easy and excellent method of testing silver ore. Neither nitric acid, nor salts of lead, copper, &c., act in the same manner as salts of silver upon iodide of starch. Nothing is easier than to prepare a test liquid with iodide of starch, by determining how much nitrate of silver it requires to lose its blue colour.

Now, suppose a specimen of argentiferous galena (sulphuret of lead) is presented, and that we wish to determine how much silver it contains. A given weight is dissolved in nitric acid, and tested with the iodide of starch solution.

It was in making these sort of experiments that M. Pisani discovered a direct means of ascertaining that iodine becomes free by the action of light upon iodide of silver. To the blue iodide of starch solution a certain quantity of nitrate of silver is added. Iodide of silver is immediately precipitated, and when enough of the silver solution has been added the iodide of starch is completely discoloured, and remains of a muddy white tint. If, now, the glass that contains it be exposed to the light, the white liquid becomes blue again in a very short time,—evident proofs that iodine is liberated from the iodide of silver which forms the precipitate.

A medical man, Dr. Duchesne Dupare, has lately presented to the Academy of Sciences here a paper upon certain therapeutic qualities belonging to one of our commonest seaweeds, *Fucus vesiculosus*. According to his account, it constitutes an excellent remedy for obesity. It can be taken in any form.

I have long since ceased to put much faith in any medicine, old or new; but a great prize having been offered in England, as you are aware, for the best essay on the uses of Marine Algæ, I was tempted to notice this. To tell the truth, however, it was the name of the plant that struck me most, and called my attention to the paper alluded to, as only three years ago my esteemed and very talented friend M. Kickx, professor of botany in the University of Ghent, described no less than 27 distinct *varieties* of this sea-weed, in a most admirable memoir* read at the Royal Academy of Sciences at Brussels, and subsequently published. *All* these varieties are to be found in the North Sea.

Fucus vesiculosus, L. is certainly one of the most interesting plants in Nature. Its geographical extension is considerable. It is met with in the Baltic, the North Sea, the English Channel, the Mediterranean, the Atlantic, the Pacific Ocean, &c. &c. The late researches of Thuret and Pringsheim have shown us that, like *Fucus serratus*, *F. vesiculosus* is dioïc, *i. e.*, that there are male and female individuals, the former being easily distinguished from the latter by the yellow colour of their seed vessels. How we should have been laughed at ten years ago, had we spoken of male and female sea-weeds!

Professor Harvey says of *F. vesiculosus*:—"This plant is extensively used in the manufacture of *kelp*, and furnishes, besides, excellent winter food for the cattle in the western islands of Scotland;" and of *F. serratus*, a species closely allied to the former, ". . . is sometimes used in the manufacture of kelp, but rarely, as it is far less productive than *F. vesiculosus*. It, however, forms excellent manure, and in Norway it is used, mixed with meal, as provender for cattle."

Photographic Societies.

FRENCH PHOTOGRAPHIC SOCIETY.

AT the meeting of this Society on May the 20th—M. Léon Foucault in the chair—M. the Count de Sevastianoff presented to the Society a volume of photographs of manuscripts of the Convent of Mount Athos. This volume contains a geography

* Sur les Variétés Indigènes du *Fucus Vesiculosus*, par J. Kickx, Prof. à l'Univ. de Gand, Membre de l'Acad. Royale des Sciences, &c., Bruxelles, Hayes, 1856.

of Ptolemy of the twelfth century (text and plates). Count Sevastianoff reported to the Society the interesting work which he had already accomplished in this direction. He possessed already more than fifteen hundred negatives, which he had been enabled, by a new process, to remove from the glass and to fix on to paper. The thanks of the Society were voted to Count Sevastianoff for the volume with which he had presented them.

Dr. Valtier mentioned to the Society an interesting fact which he had remarked, and which bore upon the researches of Moser, Niépce de St. Victor, &c. A positive proof, obtained in the ordinary way, and not fixed, having been left in contact with several nitrated sheets, superposed one on the other, he observed, not without astonishment, upon taking up these papers after the lapse of some time, that the image of the positive was reproduced with diminishing intensity, not only on the first of the superposed sheets, but actually upon four or five of the following ones. Dr. Valtier, at the time when he had observed this fact, placed in the hands of M. Laulerie, the Secretary of the Society, two of the sheets thus compressed, to illustrate his communication. Unfortunately, during the month which had elapsed since giving in his communication, these sheets had turned quite black, and the phenomenon observed by Dr. Valtier could not be seen. The Society thanked the Doctor for his communication.

M. Girard announced that he ought, at this meeting, to present, in the name of M. Davanne and himself, the continuation of their "General Investigation on Photographic Positive Proofs" (chapter on Fixing); but a circumstance had prevented them from completing their memoir in time, and they were therefore obliged to delay the publication till a future occasion. Nevertheless, in order to secure the date of publication, they thought it would be useful to inform the Society of an interesting fact which they had discovered, and which they thought was of great importance to the theory of fixing.

"There is not a photographer who has not been struck with the curious phenomenon which is produced on positive prints at the moment when, removed from the pressure frame, they are immersed in the fixing bath. Then, in fact, the proof, which is of a dark violet tint, suddenly seems to unveil itself, and the tint changes to a red coloration, of variable strength, but of perfect sharpness. This phenomenon had hitherto been explained by the decomposition of a subchloride of silver existing on the sheet on removal from the copying frame; but the theory of a subchloride having been upset by MM. Davanne and Girard, they saw the necessity of seeking another cause for the phenomenon.

"Remembering that, in the course of their researches, they had constantly seen these red colorations arising from a combination between the reduced nitrate of silver and the size, they thought that there undoubtedly lay the explanation of the phenomenon. Reflecting, likewise, on the nature of the fixing agents employed, such as hyposulphite of soda, ammonia, cyanide of potassium, &c., they remarked, that all these substances possessed an alkaline reaction. Now, we all know that the alkalies have the property of swelling up—that is to say, of bringing to a kind of imperfect solution those substances usually employed for sizing, and especially starch. It therefore appeared to them reasonable to suppose that, at the moment of immersion in the fixing bath, this exerted upon the size its alkaline reaction, swelled it up, or, in other words, caused it to undergo an incipient solution, and consequently rendered it fit to combine with the reduced nitrate of silver, which it could not previously do, owing to these bodies being all in the solid state.

"If the above hypothesis is true, an experiment ought easily to determine its correctness. It was easy, in fact, to find in the vapour of boiling water a substance which, incapable of giving rise to any chemical action on the salts present, could, nevertheless, exercise on the size the same *swelling* action as an alkali; and, consequently, upon exposing to the vapour of boiling water a violet proof taken upon starched paper, and just removed from the copying frame, we ought to see it immediately take the red tint, which it would have acquired if it had been immersed in a solution of hyposulphite of soda. On the other hand, the same proof, plunged into cold water, should not sensibly change, for cold water does not cause starch to swell in a sensible manner.

"Experience has proved the truth of this. A proof on paper sized with starch, removed from the printing frame and plunged into cold water, does not sensibly change in tone; but it passes immediately to red if it is plunged into boiling water, or simply exposed to the vapour of this liquid.

"Is this the only cause? Is the phenomenon of the change of tint of proofs complicated by accessory phenomena? This is what the authors have established in their forthcoming memoir. At present they are satisfied with making known the preceding fact, which appears to them to be of importance in the theory of fixing.

"Moreover, they have established that all salts having an alkaline reaction, such as phosphate of soda, borax, &c., act in the same way as the ordinary fixing agents, but with less energy."

At the conclusion of this communication, M. Girard per[illegible] the meeting the above mentioned experiment, [illegible]ely produced the red colour by exposing to the [illegible]iling water a violet proof which had just been removed from the printing frame, and furnished by M. Disderi.

M. Arnaud mentioned a fact that appeared to him to bear upon the preceding communication. He had frequently seen proofs, taken on English paper (that is to say, gelatinised), which, when left for some time immersed in water, acquired the red tint which the fixing agents ordinarily produce.

M. Girard observed that this fact, as had been judiciously observed by M. Arnaud, bore upon the preceding facts. In truth, English papers are sized with gelatine, and gelatine, as was known, swelled up in cold water, although slowly. Consequently, these proofs when left for some time in contact with cold water, are met with in the same chemical conditions as are the proofs on starched paper when exposed to the vapour of boiling water.

M. Léon Foucault thought that, besides the change of tint which had been mentioned, there was another point which deserved equally the attention of experimentalists. He had always seen that the tones of proofs underwent, when immersed in the fixing bath, a diminution of intensity, which should undoubtedly be attributed to the influence of the re-agent employed.

M. Girard replied, that M. Davanne and himself are equally engaged upon this point; and that, in the memoir which they should have presented upon that day to the Society, they had established the value of the different fixing agents used, according to the energy with which they could (technically speaking) redden the tones of proofs.

The Society thanked MM. Davanne and Girard for their communication.

M. Poitevin communicated to the Society a note on a new method of obtaining positives without the employment of salt[s] of silver. (See p. 210.)

In illustration of this process, M. Poitevin placed before th[e] Society several proofs taken by its means.

The Society thanked M. Poitevin for his communication.

A letter from M. Migurski, of Odessa, was read, relative to collodion process which he found very successful.

The meeting then adjourned.—*Condensed from the Bullet[in of] the French Photographic Society.*

Miscellaneous.

THE STEREOSCOPIC EXCHANGE CLUB.

We have had some complaints on the subject of the st[illegible] sent in exchange for others, not being so good as th[illegible] be. That these complaints have been so few is a pro[illegible] the whole, the exchange has been conducted in a s[illegible] manner; but still it is desirable that we should repe[illegible] an arrangement of this kind, where each person must ne[illegible] depend to a great extent on the honour of the other, the[illegible] care ought to be observed not to send a picture whic[h the] sender would not himself like to receive in exchange for a one of his own. We have no doubt that in some cases wh[illegible] has occurred that the picture sent has been an indifferent that it has arisen, not from any wilful desire on the part o[f the] sender to get a good picture for a bad one, but from his [igno]rance of what constituted a good picture. Many of [illegible] doubt, who have availed themselves of the facilities [illegible] given for forming a varied collection of stereograms in p[illegible] the otherwise limited number they could possess by

personal exertions, have been beginners. We arrive at this conclusion because it would be absurd to suppose that a man would deliberately send prints from a bad negative if he possessed a good one, even supposing him to be devoid of all pride as an artist. Real photographers will not, therefore, judge such persons harshly, even if they cannot feel themselves justified in sending good pictures in exchange for rubbish; although we are aware that, at least, two of the gentlemen whose names appear in the list have done so on two or three occasions, rather than lay themselves open to the suspicion of being wanting in good faith. The immediate cause of these remarks is a letter signed "Fair Play," who forwards us two very indifferent pictures, which have been sent to him unmounted, with a request that he would exchange. If "Fair Play" had forwarded us his name we could have dealt [illegible] the matter in a more satisfactory manner; at present we [illegible]ite unaware how they came to be sent to him. If his [illegible] on the list, why did he not forward it to us instead of signing his letter "Fair Play?" If, on the other hand, he wishes us to suppose that the name of the person who sent them is on the list, let him send us his name, and we will take steps to ascertain the truth, and prevent his continuing in a position to give any further trouble.

PHOTOGRAPHY APPLIED TO MUSKETRY.—A series of interesting and valuable experiments have been made during the last few days, by Lieutenant Walker, 79th Highlanders, of the School of Musketry Staff, Hythe, in the application of the photographic art to the science—for such it has become—of musketry, with a view of obtaining, by means of the former, a true and exact copy of the target practice of a section, or any other number of men at one or more targets. We are glad to learn that these experiments have been attended with a most satisfactory result, Lieutenant Walker having established by them the important fact that, by means of the chemical influences of light, every "hit" or impingement of a bullet, however slight, can be transferred from the target to paper with an infallible accuracy and a celerity which at once renders obsolete the former tedious and, oftentimes, inaccurate method of copying by the hand the impression made by each shot on the target's surface into a diagram, which had previously to be prepared for the purpose. This novel adaptation of photography will be found peculiarly useful in testing the comparative merits of different fire arms; and in these days of volunteer rifle corps it would prove highly useful and interesting if each company had a photograph taken of its target practice; and, as any falsification of returns would by this plan be rendered impossible, on a great comparison being made of them throughout the country, it would at once be seen to which corps belonged the palm for the best shooting.—*Hythe Gazette.*

GAS JETS MADE OF STEATITE.—The metallic jets used for gas lights have the disadvantage of rapidly oxidising, and consequently deteriorating; those of porcelain become porous, and it is on that account that it has been recently proposed to make [illegible]hem of steatite or soapstone. M. Schwartz, of Nuremberg, [illegible]pares them with an artificial steatite made of 30 parts of [illegible]nesia, 6 of silica, 3 of oxide of iron, and 5 of water. Then [illegible]ts it into small rectangular pieces, which are heated in a [illegible] for five hours, commencing with a moderate heat, so that [illegible]ter may evaporate without causing the stone to crack, [illegible]erwards raising them to a higher temperature. The [illegible] are then manufactured from these pieces, they are [illegible]d in a bath of boiling oil until they become black, they [illegible] polished with a piece of linen, and the operation is [illegible]. After being used four or five days these jets undergo [illegible]er alteration, and the orifices or holes through which [illegible] escapes remain without varying in size.

Photographic Notes and Queries.

WHITE POSITIVES ON GLASS.

SIR,—Paradoxical as it may appear, yet I feel assured that one of the great impediments to photography is that insatiable desire to discover something new, instead of improving and perfecting the good we have. My attention has been called to this fact by the stir which has lately been made by the different new processes; and again, in No. 38 of the "NEWS," p. 135, we have a paper read before the French Photographic Society on "A Method of Obtaining Pure Silvery Whites in Collodion Positives" by the addition of a large proportion of sulphuric acid to the developer. This, however plausible it may read, I feel assured is a step in the wrong direction, as it is not metallic brilliancy and consequent hardness that we want; but rather a clear but *lustreless* white, with the most gradual change to deep shadows, which latter should be *absolutely* transparent; this can be obtained by a slight modification of the old formula of sulphate of iron, acetic and nitric acids, whilst with sulphuric acid you get such brightness as to be quite offensive. In fact, some time ago a friend of mine was induced to purchase one of the advertised formulas, which proved similar to the one now under consideration, and though it gave good whites, they were far too metallic, and they had the peculiar property of radiating, as it were, into the shadows. Thus, the shirt-front of a male sitter would have a white radiation or halo run on to the vest, and even on to the coat, and this happened so frequently that he was forced to abandon it. A similar result will occur if you use *too much* nitric acid.

The theory of the changes in developing, as given by MM. Davanne and Jouet, appears to be tolerably correct; but they appear to forget that only a small portion of the sulphate of iron is decomposed, the effect of using strong solutions being merely to insure the rapid substitution of fresh particles for those which have undergone decomposition, while, if we use too much acid (it not being a neutral compound), it has an action of its own, which is always an impediment to the development, and, as I have shown, injurious to the picture. In the developer we use there is but a quantity of 3 minims of nitric acid to the pint, and we find it amply sufficient to produce the desired effect. MM. Davanne and Jouet, as chemists, ought to have recollected that in the decomposition of the free nitrate of silver, which is on the surface of the plate, that nitric acid is liberated, which, with the small amount in the developer, is sufficient to prevent the molecule of iron being deposited with that of silver, as the slight excess of the acid will always insure its immediate conversion to nitrate of iron. I feel sure that if photographers would be more uniform in their use of formulæ, much better results would be arrived at. As it is not safe to send you a glass positive, I send you a transfer from the glass, in which, though the whites suffer a little in the transferring, still I think it will abundantly bear out the justice of my remarks. In conclusion, I may add that the formula we use is,—

Protosulphate of iron	400	grains.
Glacial acetic acid	½	ounce.
Nitric acid	3	drops.
Rain water	1	pint.

The protosulphate may be increased about 50 grains in cold weather, and diminished a like quantity in hot weather, at the fancy of the operator. If with such a formula operators would pay proper attention to the arrangement of the light, and care in using their materials, I do not think we should hear much more of "redeveloping." J. WALTER.

[The transfer seems very good; and we shall be glad to receive from Mr. Walter the description of the process by which it is effected.—ED.]

REMOVAL OF SILVER STAINS.

WE extract the following from *La Lumière*:—

"As an amateur photographer, I attach a high importance to the power of removing silver stains from the hands. All the methods of accomplishing this I have met with hitherto, are either inefficacious or the substance used is dangerous; hence I am induced to bring to your knowledge a process I have discovered for removing the stains, which leaves nothing to be desired. The process is as follows:—

"Take a little chloride of lime, put it in a dish or capsule, pour a few drops of water upon it—just sufficient to reduce

it to a paste. If the stains are freshly made, they will disappear immediately on rubbing them with the paste, and the skin will be as smooth and soft as before it was stained, and will not retain the slightest trace of the discoloration. If the stains are of old date, they will require longer rubbing, and if they resist that, a few drops of hydrochloric acid may be added to the chloride of lime. However, it is hardly necessary that I should trouble you about old stains, inasmuch as no person will allow them to get old. Neither is it necessary that I should give chemical reasons why this effect should result from the use of chloride of lime. I beg you will give me your assistance in making my discovery public.—Accept, &c., "PONGON."

DIMENSIONS FOR A COPYING CAMERA.

SIR,—Would any of your readers kindly give me the dimensions of a copying camera for a 2½-inch focus double combination lens. The glasses are ¾ of an inch diameter. I want to enlarge small pictures 2 inches square to about 10×8. I fancy that the lens should be about 5 or 6 inches from the small transparent negative, and about three times that distance from the focussing screen, but of this I am not certain, and should be very glad of assistance or information on the subject. CAPT. S. S. B.

[The above distances are very near the correct ones, and might easily be verified or corrected by a few preliminary trials with a lamp and a screen. Possibly, however, some of our readers may have in use a similar apparatus. In this case, if they would favour us with a few practical data, it would be of more use than any theoretical directions we might give.—ED.]

DIPPING BATH FOR COLLODION PLATES.

SIR,—Noticing in the "PHOTOGRAPHIC NEWS" that you are proceeding with a series of articles on "Amateur Mechanics," perhaps the following method of making a dipping bath may be worth the notice of your readers. Some time ago I bought a gutta percha tray, the proper size for the plate to be excited, say 12 × 10, and cut off one of the ends, then I took a piece of crown glass, rather larger than the inside of the dish, say 12½ × 10½, heated the edges of the tray in a pan of boiling water, and laid the glass (having previously ground the edges about the eighth of an inch) on the dish and pressed the gutta percha over the edge of the glass, so that it was quite firm and water-tight. Then I took a thin piece of wood, and fastened it to the back of the bath with the liquid glue, and then hinged another piece of wood to it to form a support. I have found it answer extremely well. The dipper is easily made. D. L.

MEDIUM-COLOURED BACKGROUND.

SIR,—After many inquiries, I have failed to meet with a suitable material for a medium-coloured background which may be rolled up for portability. If any of your readers can put me in the way of obtaining or preparing such an one, it will confer a favour. G. S.

ANSWERS TO MINOR QUERIES.

MOUNTING GLASS POSITIVES.—*E. O. S. P.* Your positives have irretrievably suffered by exposure to the chemical vapours which you say are frequently evolved in the room where they are kept. You should have cemented the protecting glass on to them, and not trusted to merely placing them in contact. Proceed as follows:—Place the positive face upwards on the table, on that place the gilt mat, and then the piece of plain glass to protect the surface (be sure that the two glasses are as nearly as possible the same size), and fasten the whole tightly together by means of a strong india rubber band drawn across in one direction. Then cut four slips of gold-beater's skin a little longer than the four edges of the plates and about half an inch wide, take up the picture, mat, and glass together, and having moistened one edge, apply it on a strip of gold-beater's skin, and rub it well down on the edge, back, and front with the finger, taking especial care that the skin adheres well to the edges. Next, repeat the operation with the opposite side of the glass, and place on one side till dry. Then remove the india rubber band and place it across the plate in the opposite direction, so as to leave the uncemented edges at liberty; and, having fastened down neatly the surplus skin at the corners, repeat the process at the remaining two sides. When quite dry the skin which laps over the front of the glass can be removed by gentle friction with a fine file; and then, after giving the skin a coat of varnish, the picture will be securely protected against the deleterious effects of the atmospheric impurities.

GUTTA PERCHA IN COLLODION.—*An Anxious Amateur.* In the early days of the collodion process, Mr. Fry recommended the addition of gutta percha to collodion as a means of greatly increasing the toughness of the film. *An Anxious Amateur* will find that if he put a few square inches of thin gutta percha foil into an ounce or two of collodion, that after standing for a few days, although the collodion will not have apparently dissolved much, yet the collodion will have acquired the increased toughness about which [illegible] inquire. Mr. Howlett, speaking of this method, says—"The [illegible] way is to put some of the very thin gutta percha into a bottle, and then add some ether, and allow it to stand for two or three days. A very small quantity will have dissolved, and quite sufficient to produce a very strong film upon adding one drachm of the solution to each ounce of collodion."

TO CORRESPONDENTS.

BUNGIE.—The correspondent (Θ) who favoured us with the process at vol. i. p. 86, has given some more complete and fuller instructions at the commencement of our second volume. In the absence of the print, which you say you inclosed as a specimen of your failure (but which did not reach us), we can only recommend you to read and put into practice the fuller directions above mentioned.

C. S. W.—If the negatives have been varnished, the cracks may have arisen from the varnish having been of an inferior quality. We have lost several negatives ourselves from that cause. If they split up before varnishing, the fault was in the pyroxyline being too contractible: this may be remedied by iodising with iodide of potassium, and keeping till the collodion is slightly red, or by adding more alcohol. Several notices of this fault have appeared from time to time in our pages, and you cannot do better than consult them.

MICHAEL O'L.—1. Canvas may be prepared with the same solutions as paper, by either the calotype or positive printing process. The canvas should be stretched on a frame, and the solutions applied with a brush, with the exception of the fixing and washing. 2. It is very doubtful whether a large, cheap, single lens will take a portrait or group of still life with any satisfaction to the photographer; but as you intend to paint over the photograph in oil colours, great perfection is not needed.

J. W.—1. The size of the glass room must entirely depend upon the expense you wish to go to. Do not have it smaller than will be needed for the lenses and cameras you intend to work with. One 20 feet long, 12 feet wide, and 10 feet high, with a ridge and furrow roof, will be convenient for ordinary work. 2. Perhaps your bath is too acid. The spots may be avoided by allowing the collodion to thoroughly settle before using. 3. Neither of the lenses are what might be considered first-rate.

J. W. COFFIN.—You will most likely succeed in cleaning your daguerreotype by one of the methods recommended in our recent numbers.

ARTIZAN AMATEUR.—1. Allow a solution of cyanide of potassium (an ounce to a pint) to stand in the gutta percha dish for some hours; at the end of that time the stains will in all probability be removed. Then wash, and after rinsing out with dilute nitric acid (1 part to 5 of water), well wash with water. 2. Sensitising in a 30-grain bath would make the process much better. You can try adding a fourth part of alcohol to each of the baths—trying the effect of one before commencing with the other. In so purely an experimental trial, we cannot give very trustworthy advice. 3. Use 10 grains of gelatine to the ounce: it may be put in the iodising solution. 4. Yes, the formula for aceto-nitrate of silver given will do. 5. About equal parts. It will keep for months, in solution, in a good corked bottle. 6. We have never heard of such a cause of failure before; but it is very likely that the distilled water was the cause, as it had a strong smell. Citric acid would not have produced the effect. 8. Negatives may be [illegible] after fixing in brine as long as you like, provided you keep them dry [illegible] do not expose them to the light. 9. A little salt in the iodising ba[illegible] great improvement in the calotype and wax paper process. It may [illegible] fifth the quantity of the iodide present. 10. You will not be abl[illegible] veniently prepare the salts you mention by adding weighed and c[illegible] quantities of the acids and bases together; your best plan will [illegible] solutions of the acids to the alkalies, and bring the mixture quit[illegible] by means of test papers. 11. Your precipitate is not tartrate of [illegible] bitartrate of soda—a salt containing two equivalents of acid to on[illegible] We have not seen the pamphlet.

B. H.—1. Rubbing well with a wash leather and whitening will ans[illegible] 2. The collodion is made of methylated alcohol instead of pure spirit. [illegible] is no remedy but getting better collodion.

ERRATUM.—Page 192, line 22 from top, for "hypo." read "pyrogallic a[illegible]"

Communications declined, with thanks.—F. R. S. O.—Xylo.

The information required by the following correspondents is either such [illegible] we are unable to give, or it has appeared in recent numbers of [illegible] "PHOTOGRAPHIC NEWS:"—Vanitas Vanitatis.—C. O. S. O.—X

IN TYPE:—Jesse Harding.—F. L.—J. Jopling.—J. F.—Artizan Amateur.—H. T. T.—W. Boyer.—G. H. W.—Peter Positive.—Viator.—A Bathonian.—M. M. D.—R. M. S.—H. and J. Walter.

Editorial communications will not be received unless fully prepaid, and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, [illegible] of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Pr[illegible] letters for the Editor, if addressed to the office, should be marked "private[illegible]

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 45.—*July* 15, 1859.

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ON PHOSPHORESCENCE, FLUORESCENCE, &c.

BY PROFESSOR FARADAY, D.C.L., F.R.S.

We have great pleasure in laying before our readers the following official report, by Professor Faraday, of his lecture on the above subject, delivered at the last meeting of the Royal Institution:—

"The agent understood by the word 'light,' presents phenomena so varied in kind, and is excited to sensible action by such different causes, acting apparently by methods differing greatly in their physical nature, that it excites the hopes of the philosopher much in relation to the connection which exists between all the physical forces, and the expectation that that connection may be greatly developed by its means. This consideration, with the great advance in the experimental part of the subject which has recently been made by E. Becquerel, were the determining causes of the production of this subject before the members of the Royal Institution on the present occasion. The well-known effect of light in radiating from a centre, and rendering bodies visible which are not so of themselves, as long as the emission of rays was continual—the general nature of the undulatory view, and the fact that the mathematical theory of these assumed undulations was the same with that of the undulation of sound, and of any undulations occurring in elastic bodies, were referred to as a starting position. Limited to this effect of light it was observed that the illuminated body was luminous only whilst receiving the rays or undulations. But superadded occasionally to this effect is one known as *phosphorescence*, which is especially evident when the sun is employed as the source of light. Thus, if a calcined oyster-shell, a piece of white paper, or even the hand, be exposed to the sun's rays, and then instantly placed before the eyes in a perfectly dark room, they are seen to be visible *after* the light has ceased to fall on them. There is a further philosophical difference, which may be thus stated: if a piece of white oyster shell be placed in the spectrum rays issuing from a prism, the parts will, as to illumination, appear red, or green, or blue, as they come under the red, green, or blue rays; whereas if the phosphorescent effect be observed, *i.e.*, that effect remaining after [illegible] illuminating rays are gone, the light will either be white, [illegible] tint not depending upon the colour of the ray pro- [illegible]t, but upon the nature of the substance itself, and [illegible] for all the rays. The ray which comes to the eye [illegible]nary case of visibility, may be considered as that [illegible]nating from the luminous body, has impinged [illegible]bstance seen, and has been deflected into a new [illegible]mely towards the eye; it may be considered as [illegible] ray, both before and after it has met with the [illegible]dy. But the light of phosphorescence cannot be so [illegible]ed, inasmuch as *time* is introduced; for the body is [illegible] for a time sensibly after it has been illuminated, [illegible]h time in some cases rises up to minutes, and perhaps [illegible]ours. This condition connects these phosphorescent bodies with those which phosphoresce by heat, as apatite and fluor-spar; for when these are made to glow intensely by a heat far below redness, it is evident that they have acquired a state which has enabled them for a time to become original sources of light, just as the other phosphorescent bodies have by exposure to light acquired a like state. And then again there is this further fact, that as the fluor-spar, which has been heated, does not phosphoresce a second time when reheated, still it may be restored to its first state by passing the repeated discharge of the electric spark over it, as Pearsall has shown. Then follows on (in the addition of effect to effect) the phenomena of *fluorescence*, and the fine contributions to our knowledge of this part of light by Stokes. If a fluorescent body, as uranium glass, or a solution of sulphate of quinine, or decoction of horse-chestnut bark, are exposed to diffuse daylight, they are illuminated, not merely abundantly but peculiarly, for they appear to have a glow of their own; and this glow does not extend to all parts of the bodies, but is limited to the parts where the rays first enter the substances. Some feeble flames, as that of hydrogen, can produce this glow to a considerable degree. If a deep blue glass be held between the body and the rays of the sun, or of the electric lamp, it seems even to increase the effect; not that it does so in reality, but that it stops very many of the luminous rays, yet lets the rays producing this effect pass through. By using the solar or electric spectrum, we learn that the most effectual rays are in most cases not the luminous ones, but are in the dark part of the spectrum; and so the fluorescence appears to be a luminous condition of the substance, produced by dark rays which are stopped or consumed in the act of rendering the fluorescent body luminous: so they produce this effect only at the first or entry surface, the passing ray, though the light goes onward, being unable to produce the effect again; and this effect exists only whilst the competent ray is falling on to the body, for it disappears the instant the fluorescent substance is taken out of the light, or the light shut off from it. When E. Becquerel attacked this subject, he enlarged it in every direction.* First of all, he prepared most powerful phosphori; these being chiefly sulphurets of the alkaline earths, strontia, baryta, lime. By treatment and selection he obtained them so that they would emit a special colour: thus, seven different tubes might contain preparations which, exposed to the sun, or diffused day-light, or the electric light, should yield the seven rays of the spectrum. The light emitted generally possessed a lower degree of refrangibility than the ray causing the phosphorescence; but in some instances he was able to raise the refrangible character of the ray emitted to that of the exciting ray. By taking a given preparation, and raising it to different temperatures, he caused it to give out different coloured rays by the single action of one common ray; this variation in power returning to a common degree as the temperatures of the phosphori became the same in all. He showed that *time* was occupied in the elevation of the phosphorescent state by the ray; and also that time was concerned in various degrees during the emission of the phosphorescent ray: that this time, which in many cases was long, might be affected, being shortened by the action of heat, and then the brilliancy of the phosphorescence for the shortened time was increased. He showed the special relation of the different phosphori to the different rays of the spectrum, pointing out where the maximum effect occurred; also that there were the equivalents of dark bands, *i. e.* bands in the spectrum, where little or no phosphorescence was produced. These phosphori were many of them highly fluorescent. Thus, if one of them was exposed to the strong voltaic light, and then placed in the dark, it was seen to be brilliantly luminous, gradually sinking in brightness, and ultimately fading away altogether; but if it were held in the

* *Annales de Chimie et de Physique*, 1859, tome lv. p. 1.

rays beyond the violet end of the spectrum (the more luminous rays being shut off) it was again seen to be beautifully luminous, but that state disappeared the instant it was removed from the ray. Now this is fluorescence, and the same body seemed to be both phosphorescent and fluorescent. Considering this matter, and all the circumstances regarding time, Becquerel was led to believe that these two luminous conditions differed essentially only in the *time* during which the state excited by the exposure to light continued; that a body being really phosphorescent, but whose state fell instantly, was fluorescent, giving out its light while the exciting ray continued to fall on it, and during that time only; and that a phosphorescent was only a more sluggish body, which continued to shine after the exciting ray was withdrawn. To investigate this point he invented the *phosphoroscope;* an apparatus which may vary in its particular construction, but in which discs or other surfaces illuminated by the sun or an electric lamp might, by revolution, be rapidly placed before the eye in a dark chamber, and so be regarded in the shortest possible space of time after their illumination. By such an apparatus Becquerel showed that all the fluorescent bodies were really phosphorescent; but that the emission of light endured only for a very short time. An extensive series of experimental illustrations upon the foregoing points was made with fine specimens of phosphori, for which the speaker was indebted to M. Becquerel himself. The phosphoroscope employed consisted of a cylinder of wood, one inch in diameter and seven inches long, placed in the angle of a black box with the electric lamp inside, so that three-fourths of the cylinder were external, and in the dark chamber where the audience sat, and one-fourth was within the box, and in the full power of the voltaic light. By proper mechanical arrangements this cylinder could be revolved, and the part which was at one instant within, rapidly brought to the outside, and observed by the audience. As the cylinder could be made to revolve 300 times in a second, and as the twentieth part of a revolution was enough to bring a sufficient portion of the cylinder to the outside, it is evident that a phosphorescent effect which would last only the 1,3000th or even the 1,6000th of a second might be made apparent. All escape of light between the moving cylinder and the box was prevented by the use of properly attached black velvet. The cylinder was first supplied with a surface of Becquerel's phosphori. The effect here was, that when by rotation the part illuminated was brought outside the box, it was found phosphorescent. If the cylinder continued to rotate it appeared equally luminous all over, and when the rotation ceased, or the lamp was extinguished, the light gradually sank as the phosphorescence fell. Then a cylinder having a surface of quinine or æsculin was put into the apparatus. Whilst the cylinder was still it was dark outside; but when revolving with moderate velocity it became luminous outside, ceasing to be so the moment the revolution stopped. Here the fluorescence was evidently shown to occupy time; indeed, the full time of a revolution: and taking advantage of that, the self-shining of the body was separated from its illumination within, and the fluorescence made to assume the character of phosphorescence. Another cylinder was covered with crystals of nitrate of uranium, a hot saturated solution having been applied over it with a fine brush. The result was beautiful. A moderate degree of revolution brought no light out of the box; but with increased motion it began to appear at the edge. As the rapidity became greater, the light spread over the cylinder, but it could not be carried over the whole of its surface. It issued as a band of light where the moving cylinder left the edge of the box, diminishing in intensity as it went on, and looking like a bright flame, wrapping round half the cylinder. When the direction of revolution was reversed, this flame issued from the other side; and when the motion of the cylinder was stopped, all the phenomena of fluorescence or phosphorescence disappeared at once. The wonderfully rapid manner in which the nitrate of uranium received the action of the light within the box, and threw off its phosphorescence outside, was beautifully shown. The electric light, even when the discharge is in rarefied media, or as a feeble brush, emits a great abundance of those rays, which produce the phenomena of fluorescence; but then if these rays have to pass through common glass, they are cut off, being absorbed and destroyed even when they are not expended in producing fluorescence or phosphorescence. Arrangements can, however, be made in which the advantageous circumstances can be turned to good account with such bodies as Becquerel's phosphori or uranium glass. If these be enclosed within glass tubes, having platinum wires at the extremities, and which are also exhausted of air and hermetically sealed, then the discharges of a Ruhmkorff coil can be continually sent over the phosphori, and the effects both fluorescent and phosphorescent be beautifully shown. The first or immediate light of the body is often of one colour, whilst on the cessation of the discharge the second or deferred light is of another; and many variations of the effects can be produced. In connection with rarified media it may be remarked, that some of the tubes by Geissler and others have been observed to have their rarified atmospheres phosphorescent, glowing with light for a moment or two after the discharge through them was suspended. Since then Becquerel has observed that oxygen is rendered phosphorescent, *i. e.*, that it presents a persistent effect of light, when electric discharges are passed through it. I have several times had occasion to observe that a flash of lightning, when seen as a linear discharge, left the luminous trace of its form on the clouds, enduring for a sensible time after the lightning was gone. I strictly verified this fact in June, 1857, recording it in the *Philosophical Magazine*,* and referred it to the phosphorescence of the cloud. I have no doubt that that is the true explanation. Other phenomena, having relation to fluorescence and phosphorescence, as the difference in the light of oxygen and hydrogen exploded in glass globes, or in the air, were referred to, with the expression of strong hopes that Becquerel's additions to that branch of science would greatly explain and extend them."

THE GENESIS OF PHOTOGRAPHY: ITS INVENTION IN ENGLAND.

It has been truly observed that the invention of most subjects connected with art or science, is veiled in obscurity. Thus, the real inventor of typography is not accurately known, and this only relates to the art of printing as invented and practised in Europe, while the Chinese block-printing belongs, probably, to a very remote period of history.

It is different with photography, the idea of which sprung, Minerva like, from the brains of one man; and it is in England where this art has been discovered. We have received the following account from the lips of the late *Francis Bauer*, botanical painter to Kew Gardens, brother of [illegible] still more known Ferdinand Bauer, painter to the [illegible] Australian expedition under Captain Flinders, R. N. [illegible]

M. Bauer's account was the following:—

"It was at an early period of the present cent[illegible] M. Nièpce called upon me, showing me some spe[illegible] an engraving or drawing, the correctness of w[illegible] astonishing, but the nature and process of which I c[illegible] guess. As M. Nièpce spoke much of the importan[illegible] invention, I induced him to address a memoir on the [illegible] to the Royal Society of London, of which I then wa[illegible] yet a member. M. Nièpce, in doing so, only alluded [illegible] general terms to his invention, but did not like at once to disclose the preparation of the plate, &c. On this ground the Council of the Royal Society took exception, and answered, that as there was a *secret* implied in the invention of M. Nièpce, they could not take any cognizance of it." And there the matter ended!

Now, it can easily be understood that a responsible

* *Philosophical Magazine*, June, 1857, p. 3[illegible].

learned body could not well entertain any secret relating to a quack medicine, &c.; but why photography had to be comprehended in a similar ban, is difficult to guess. M. Nièpce, therefore, left England. But I think that even Daguerre never questioned the priority or contemporaneity of M. Nièpce's invention, who also, or his relicts, received some recompense from the French Government. Such, however, were the reasons why photography (heliography) has become a French, and not an English invention. As the originals of the application to, and correspondence of M. Nièpce with the Royal Society of London, must be still in existence in Burlington House, their publication will much interest the many admirers of heliography, the early history of which art has now become of great interest. We may learn, then, which we could not otherwise, what were the first and genetic ideas and intentions of M. Nièpce in London, about 1813.

Thus things stood when N. Nièpce de St. Victor (a nephew of the inventor of photography) published his first work: "*Traité pratique sur la gravure heliographique.* Paris, 1856." It appears from the preface, that the first experiments on the subject were made as far back as 1813—probably the period alluded to by R. Francis Bauer. M. Nièpce, jun., does not say anything about the application of his uncle to the Royal Society of London—either not been aware of anything of the sort having taken place, or treating the affair as antiquated and of no further consequence.

This incident affords us an opportunity of comparing the activity of the Royal Society of London with that of the Institute of France (*Acadamie des Sciences*) in Paris, and what chances they offer respectively to fostering and introducing great inventions in science and the arts. The Institute of France, established during the Great Revolution of 1790, was, probably, laid out on a freer basis than the Royal Society of London, founded so long previously. Bonaparte, who was an ordinary Member of the Mathematical Section, was in the habit, when First Consul, of assisting at the ordinary meetings quite *sans façon.* The revolution of 1830 added a new department to the French Institute, *la section de la morale et politique.* All this extended and expanded the activity of the neighbouring Society; large prizes were founded by Government and private bequest, &c.; and thus, then, the Institute of France is that body, before whose tribunal now every invention, every improvement, every new plan is brought; sure to meet with a competent and really impartial decision. The *Comptes Rendus*, and the detailed reports of their meetings (the anniversary being open to the public), have made the Institute a truly national, we may say, European establishment, and thus a repetition of the *rebuque* given to the inventor of photography could not and would not occur. Still, as the Fellows of the Royal Society, and other high patrons of science, have now even established a fishing club on a charming site of the *Thames*, it is to be supposed that they will henceforth take a more *current* and enlivened view of inventors and *innovators.*

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INDELIBLE POSITIVES.

BY M. LAFON DE CAMARSAC.

o before the progress realised in this direction by other otographers, the gentleman whose name appears at the ead of this article was struck with the luminous idea of substituting for the reduced silver or other matter which forms ordinary photographic positives, different substances applied in a state of powder, which should render them indelible, with or without the aid of fire. In giving a summary of the lucid exposition of the French Photographic Society, we referred to the beautiful enamels exhibited by M. Lafon, in concert with M. Disdéri; recently, this distinguished photographer called upon us for the purpose of showing us these magnificent carbon positives, which we briefly noticed in our last number. Rejoicing in this brilliant result, which gave us an opportunity of doing justice to a hard-working experimentalist of whom no mention was made by M. Paul Perrier in his report, we begged M. Lafon de Camarsac to draw up a note stating the bearing of his discovery. This note has just reached us, and we publish it for the benefit of our readers, simply calling their attention to the fact that it opens quite a new field to photography:—

"At the commencement of the year 1855, in a memoir presented to the Academy of Sciences at its sitting of the 11th of June, an analysis of which was published in *Cosmos* of the 29th of the same month, I detailed processes which enabled me to form the heliographic image in very different materials. The colouring substances chosen according to the taste of the operator, were in reality substituted for the photogenic matter and fixed on glass, porcelain, enamel, metals, ivory, paper, and wood. Proofs formed of oxides of copper, iron, manganese, cobalt, gold, and silver, fixed on glass and enamel by fusion in a muffle furnace, presenting, with the certain guarantee of permanency, a great variety and very brilliant colour, were placed before the members of the Academy. Pursuing for many years past the problem of the perfect fixing of the image, I, at that epoch, approached it from its most difficult side, but, at the same time, the most conclusive, by producing images incrusted by the action of fire in ceramic substances, the duration of which is indefinite. Though many interesting applications of my discovery have presented themselves to my mind since then, I felt that I must before all other things seek to improve the optical character of the image, to simplify the practical operations, and the solution of the problem of curved and irregular surfaces of the objects operated upon, and also to experiment on the colouring pigments relative to their stability, and the method of fixing them on different objects. These improvements being absolutely necessary before attempting to apply it to the arts and manufactures, have occupied my attention up to the present moment.

"*Substances which bear the image; agents of colouration*:—Soft porcelain, enamel-paste, and crockery. The image is formed of metallic oxides, and fixed in the muffle furnace. Hard porcelain, biscuit, hard enamel, glass and crystal. The metallic oxides are strengthened with their fluxes, and fixed in the muffle furnace. If the biscuit is to receive a glaze, I use cobalt and the other colours employed in the hottest furnace. On these different substances, whether white or coloured, I also form the images in gold, or in silver strengthened with their fluxes. I fix in the muffle furnace. I preserve the deadness of the metal in the second case; in he first, I burnish.

"*On Silver.*—The image is made in gold, or by the combination of silver and lead used in enamel work. I fix in the fire. Papers, parchment, gelatine, ivory, wood, prepared linens, &c. The image is formed with any colouring substance, and I fix it with gum, albumen, size, oil, varnish, or encaustic. On these different coloured substances, images may also be formed in silver, gold, or bronze.

"The colouration with vitrificable colours has no limit except the palette itself of coloured enamels. With papers it may be varied *ad infinitum.* In both cases, as regards delicacy and homogeneity of appearance, there is no objection to forming the images of a mixture of colouring substances, having regard, as respects vitrificable substances, to the laws which preside over their combination under the influence of fusion.

"All the images I have mentioned may be drawn with the pencil. The image may also, within certain limits, be obtained *photographically* in varied colours. This is of importance to the final colours of the proof, because the painter has not in this case to struggle against the monotony of the ground; he finds under his pencil a sketch coloured with a view to the final harmony of the picture; he may henceforth attain the richest of tones, without danger of injuring the invaluable design made by the light by imparting it.

"Whatever may be the object on which it is desired to obtain the image, this image may always be composed of the most permanent materials. The appearance of deadness, or lustre, of plating or gilding, and of colouring, may be conferred according to the purpose to which the object is destined. These results are attained on all objects, whatever their form. The photographic problem thus finds its complete solution:—

"*In vitrifiable substances or mixtures of metals:* by furnishing an admirable decoration to the ceramic and glass arts, to jewellery, and the greater part of the manufactures which employ the first substances.

"*In the case of ivory, prepared wood, cotton fabrics, &c.:* by substituting beautiful designs for the rude drawings so generally employed in the manufactures which employ these materials.

"*In the case of paper with the image in carbon, or any other substance not easily alterable:* by enabling museums to enrich their collections in various ways, with galleries of illuminated portraits, the reproduction of grand scenes, unimpeachable documents for history, book illustrations, &c. These processes, so fruitful in result, were described by me in 1855, and, as I think, have given rise to the carbon and other similar processes which are relatively quite new. They have received many improvements in other hands since that time; but the principle remains the same, and I think in photography it is definitive.

"The images I can produce are so perfect that *I reproduce as a negative on glass, waxed paper, and with carbon*, a negative with all the delicacy and vigour of the original."—*Cosmos.*

THE ACTION OF ACID LIQUIDS ON GUTTA PERCHA BATHS.

BY ALEXANDER WATT.

Of the "many ills which" photography "is heir to," I believe none to be so frequent or objectionable as that which is dignified by the term "fogging."

Whether fogging of the plates arises from light entering the dark room or camera; from impurity of any of the chemical substances employed; from over-exposure, or from any other cause, it is equally unpleasant and annoying; and as we photographers are all engaged in a pursuit which will probably ever be an experimental one—for there are so many circumstances which prevent our reducing the operations to a positive certainty—I think all will agree that, by making known the results of our own practical experience in any way, we may confer benefit upon each other and the profession at large.

One of the causes of "fogging," which has given me great annoyance, has been *the action of the exciting solution upon the gutta percha bath;* and this has occurred very frequently, but more especially when the nitrate has been in an acid state.

In many instances I have left the bath in splendid working condition up to the latest hour in the evening, and when I have resumed my labours on the following morning, to my inexpressible dismay, I have found it utterly impossible to take a clear picture. Being perfectly certain that there was but one cause for this change—namely, the leaving the exciting solution in the gutta percha bath during the night, I next turned my attention to restoring the solution to good working condition. I therefore added a few drops of glacial acetic acid, which had little or no effect. I now added about a drachm of the acid, and sensitised a plate, when I found an evident improvement, but it was not until I had added more than two drachms of acetic acid to the 20 ounce bath that it was in good condition, and then it certainly did yield most brilliant, clear, and intense negatives.

It is generally found that acetic acid produces a retarding action when employed in large quantities in the bath, but this I did not find the case when the bath was in the condition referred to. On the contrary, each time I added fresh acid I observed a remarkable improvement in the sensitiveness of the bath, for the exposure required in the camera was reduced from about 20 seconds to 2 seconds at farthest, with the addition of a stop.

Feeling satisfied that it would be unwise to allow the acetic nitrate to remain in the gutta percha vessel after I had done with it, I transferred it to a bottle, and the next day it worked as well as ever. This, also, clearly proved that the gutta percha had been the cause of fogging in the first instance.

Some time after this, I again omitted to bottle the bath after using it; and, as before, the next day it proved quite impossible to take a negative, as the plate became fogged all over, in fact, as much so as if I had developed in open daylight. I therefore applied the usual remedy—acetic acid. I at once boldly added 2 drachms of the acid, and a visible improvement showed itself; but this time it was not until I had added *nearly an ounce* of acid that the bath worked well; and this time, as before, the bath was very sensitive.

At last, some days after this, I found that when the aceto-nitrate had been in the bath for two or three hours, or even less, it gradually began to produce foggy negatives, and each time I was obliged to add more acid, until I had in the 20 ounces of solution nearly *three ounces* of acetic acid. Although the bath would work well then, I found that it was impossible to depend upon it, and I felt satisfied that the more acetic acid I had in the solution—although it enabled me to obtain good pictures for a time—the more susceptible it was of being influenced by the gutta percha vessel.

By this time I vowed vengeance against all gutta percha baths and their manufacturers, and this was not the first time I had had occasion to regret employing gutta percha vessels in chemical operations. Some years ago, I had used a large wooden tank, lined with gutta percha, for the purposes of electro-plating, and when the solution of cyanide of silver had been in this bath for a few months, I found that the solution had become much injured by the action of the cyanide of potassium upon the gutta percha; and at last the solution became spoiled, and I was obliged to precipitate the silver, by sulphuric acid, for the purpose of separating it from foreign matter. When the acid was added to the cyanide of silver, a substance in large clots arose to the surface, which, on being heated, proved to be *gutta percha.* This substance, held in solution by the cyanide, was liberated or disintegrated by the sulphuric acid. I mention this circumstance to show that gutta percha is not, as we have been led to suppose, a harmless material to make chemical vessels of, and I should strongly advise all photographers to avoid placing an aceto-nitrate solution in a bath made of this material, although I believe, by this time, the advice to be like informing a man that Queen Anne is dead; however, there are still some persons, probably, who may receive the recommendation with benefit.

From the facts above recorded, I am led to believe that it is the acetic acid, and not the nitrate of silver, which acts upon the gutta percha; for when a neutral bath, or one which is only faintly acid, is employed—as such a bath would be when newly prepared—it may remain in the gu[illegible] percha vessel for months without producing foggy pict[illegible] this I have proved over and over again, I think, most [illegible] factorily. And, as I have before stated, I have found [illegible] the greater the amount of acetic acid in the bath, the [illegible] easily was it influenced by the gutta percha vessel.

But it did seem strange that, up to a certain time, [illegible] compound of gutta percha and acetic acid, which I imagi[illegible] existed in the bath, was favourable to sensitiveness, and to giving good intense negatives. Now, whether the presence of a *little* organic matter, held in solution by acetic acid, in the bath, would prove serviceable or not, I should be afraid to say, but I am rather disposed to think that it would be serviceable, more especially if the exciting solution were kept in a glass or porcelain vessel, where it would undergo no further alteration from foreign matter.

I am disposed to think, also, that an exciting bath which had begun to fog from being kept in a gutta percha vessel,

would, if acetic acid were added to it until it produced clear pictures, and the bath were then transferred to a glass or porcelain vessel, it would continue to work well under such circumstances. But I do not feel sufficiently certain upon this point to assert it as a fact.

In conclusion, I would prefer working with a glass or porcelain bath, fitted with a "jacket" of gutta percha, which would not only keep out the light, but protect the glass from injury.

THE PRODUCTION OF PICTURES BY MEANS OF IODINE AND GUAIACUM RESIN.*

BY L. E. JONAS.

THE property of vapours of iodine when they pass over any surface, of depositing themselves in the form of fine crystals of iodine upon all elevations, has been employed by the author in producing impressions of lithographs, &c. If a picture of this kind be exposed to vapour of iodine, and then pressed upon a paper moistened with tincture of guaiacum, a blue copy is obtained. To produce a good result, the following things are requisite:—

1. A paper of peculiar strength, evenness, firmness, and smoothness, and quite free from starch.
2. An alcoholic solution of guaiacum, which especially possesses the property of acquiring a blue colour (1 part of resin and 32 parts of alcohol).
3. The maintenance of a definite degree of moisture at the moment of pressure, and the coating of the paper with the solution of guaiacum.
4. Powerful pressure upon the original, which must be sufficiently iodised to allow the iodine to penetrate the paper.

The more delicate and clear the picture or writing which is to be copied, the better is the result; other objects which present distinct elevations and flat surfaces may be printed from by suitable arrangements; this is especially the case with parts of plants, as in the well-known nature-printing.—*Journal für Prakt. Chemie*, lxxv., p. 244.

* From the *Chemical Gazette*.

HELIOGRAPHIC ENGRAVING IN RELIEF.

HAVING already described M. Berchtold's process of engraving in detail, there is no necessity for our describing it anew, but we may mention that he has made another step in advance. The roundness, or, as artists term it, the model, being due to the difference in the number and arrangement of the lines, it occurred to M. Berchtold that by using a negative as a type, the plate might be bitten into to a sufficient depth to make an engraving in relief, like an engraving on a wood block, without interfering with this model. We are told that he has succeeded in engraving in this way a plate with the bust of the Empress Eugenie, from which proofs have been printed typographically with the same facility as from wood.

Critical Notices.

Stereograms of Dovedale, &c. By MR. W. WOODWARD.

IF a foreigner, who was desirous of seeing some of the most picturesque spots in this country, were to ask what part of England we considered best calculated to give a good idea of our landscape scenery, we should say, almost without hesitation, Dovedale. It is well known that Derbyshire is considered one of the most beautiful counties in England, on account of the varied character of its scenery—so bold, yet so enchanting. There are, probably, more beautiful pieces of landscape scenery, of the truly English class, to be seen in Derbyshire than anywhere else in the United Kingdom. But the most beautiful portion of that county is Dovedale. To the photographer who is desirous of obtaining good landscape views, it is invaluable, as he can scarcely place his camera in any position without securing a good picture. Mr. Woodward, however, seems to have been most careful in the selection of his pictures. His views of those places which are well known, have been taken in most instances from the best possible position. The consequence is, that the views before us are the most artistic that we have seen for some time. They rise far above the ordinary class of landscape slides which we have seen, and to persons desirous of possessing really good landscape pictures, we can most conscientiously recommend them. In regard to the photographic manipulation, they bear the traces of the same careful treatment which marks Mr. Woodward's productions. While the printing is admirable and exceedingly uniform, they are rich in tone and clear in definition; there is an absence of the leaden cold tone which too often disfigures stereoscopic landscape views. Apart from the pleasure and instruction which slides of this class must give to the general public, we think that they are calculated to be of great use to the artist as studies. Every one of the pictures before us would make the groundwork for exquisite landscape pictures, and had they only colour they would be certain to attract great attention as artistic in selection of site. "The Needle Rocks," and the "View from Lovers' Leap," are two charming pieces of landscape scenery, and are, perhaps, the best in the series. The other views chiefly consist more or less of river scenery, which are very cleverly given; perhaps the least successful is the rock called "Dovedale Church," owing to the large mass of white which is in the centre of the picture, and again, the abrupt effect which is produced by stopping out the sky. In the other river views the effect has been much more ably rendered than in the slide above alluded to; the reflections in the water and the distant half tints, combined with the greatest delicacy of detail, make them very beautiful views. These views are respectively called—"View near the Entrance to the Dale," "The Stret Rock," "The Twelve Apostles," "The Pickerill Tor;" the first-named contain very many beauties, both artistic and photographic, as also does the "Twelve Apostles." In fact, it is almost useless to institute comparisons between the different slides, seeing that so much depends upon the character of the view to be rendered. In taking views of this high class, Mr. Woodward is doing good service to photography, by raising it from the degrading position to which some would-be artists are attempting to drag it.

Dictionary of Photography.

EFFLORESCENCE.—Some salts when kept in a dry atmosphere crumble to powder, losing the whole or part of their water of crystallisation, while in a moist atmosphere they may be preserved unchanged. This phenomenon is called efflorescence.

ELECTRO-SILVER PLATING.—The art of covering a metallic plate with a surface of silver by means of the galvanic battery. In order to insure a perfectly pure surface of silver many operators deposit a thin film on the daguerreotype plate by the galvanic battery; this is a good plan, and well repays the additional trouble by the superior brilliancy of the proofs obtained. The apparatus necessary is a small galvanic battery and a jar of suitable size and shape. The jar is filled with a solution of—

Cyanide of potassium	2	ounces.
Water	20	ounces.
Oxide of silver	½	ounce.

As soon as the cyanide and oxide are dissolved, the liquid is ready for use. A piece of silver should be placed in the solution jar, and connected by means of a wire with the negative (zinc) pole of the battery; another wire with a clip at one end to hold the plate is attached to the positive pole. The plate to be silvered should be perfectly cleaned and polished, and when attached to the clip plunged into the silver solution opposite to the silver foil, and suffered to remain until the desired quantity of silver is deposited upon it; it should then be taken out, washed with clean water, and cleaned and polished as before.

EQUIVALENTS, TABLE OF.—In our "Chemistry" we gave a table of the equivalents of those elementary bodies which are most frequently met with in works on photography or

general science. Since then several alterations and amendments have been introduced into the equivalent numbers of many of the elements. We give below a complete list of the elementary bodies as at present known, together with the symbols by which they are designated in chemical language, and their equivalents or combining proportions, compiled from the most recent trustworthy authorities:—

Aluminium	Al	=	13·75	Nickel	Ni	=	29·5
Antimony	Sb	=	103	Niobium	Nb		
Arsenic	As	=	75	Nitrogen	N	=	14
Barium	Ba	=	68·5	Norium	No		
Beryllium	Be	=	6·9	Osmium	Os	=	99·6
Bismuth	Bi	=	210	Oxygen	O	=	8
Boron	B	=	11	*Palladium*	Pd	=	53·3
Bromine	Br	=	80	Pelopium	Pe		
Cadmium	Cd	=	56	Phosphorus	P	=	31
Calcium	Ca	=	20	*Platinum*	Pt	=	98·7
Carbon	C	=	6	*Potassium*	K	=	39
Cerium	Ce	=	47	*Rhodium*	R	=	52·2
Chlorine	Cl	=	35·5	*Ruthenium*	Ru	=	52·2
Chromium	Cr	=	26·7	Selenium	Se	=	39·75
Cobalt	Co	=	29·5	Silicium	Sl	=	14
Copper	Cu	=	31·75	Silver	Ag	=	108
Didymium	D	=	50	Sodium	Na	=	23
Erbium	E			Strontium	Sr	=	43·75
Fluorine	Fl	=	19	Sulphur	S	=	16
Gold	Au	=	197	*Tantalum*	Ta	=	184
Hydrogen	H	=	1	Tellurium	Te	=	64·5
Ilmenium	Il			Terbium	Tb		
Iodine	I	=	127	*Thorium*	Th	=	59·6
Iridium	Ir	=	99	Tin	Sn	=	59
Iron	Fe	=	[illegible]	*Titanium*	Ti	=	25
Lanthanium	La	=	47	Tungsten	W	=	92
Lead	Pb	=	103·5	*Uranium*	U	=	60
Lithium	Li	=	6·5	*Vanadium*	V	=	68·6
Magnesium	Mg	=	12	Yttrium	Y		
Manganese	Mn	=	27·5	Zinc	Zn	=	32·75
Mercury	Hg	=	100	*Zirconium*	Zr	=	22·4
Molybdenum	Mo	=	46				

The equivalent numbers of those elements which are in *italics* are doubtful, as they have not been the subject of very recent investigation.

ETHER.—Ether is a colourless, transparent, and very mobile liquid, evaporating with the greatest facility, boiling at 96° Fahrenheit, and having a specific gravity of 0·72. Its vapour is excessively heavy and pours like water; it is very inflammable, and when mixed with air and ignited it explodes with violence, and may thus give rise to serious accidents. On this account, great care should be taken, when considerable quantities of ether are being transferred from one vessel to another (as in the preparation of collodion), that no fire or burning body is near; and any stock of this liquid should be kept in a safe place away from the laboratory. Ether, when volatilising, produces considerable cold, and for this reason the under surface of the glass when being coated with collodion becomes covered with a mist arising from the condensation of the aqueous vapour. When preserved in an imperfectly stoppered bottle, ether absorbs oxygen and becomes acid from the production of acetic acid; this attraction of oxygen is increased by elevation of temperature. Commercial ether often contains a large amount of alcohol and water. The presence of the former body may be recognised by shaking a certain quantity of ether in a tube with its own bulk of water and allowing the mixture to separate again into two layers: if there is no alcohol present, the volume of the water ought only to increase very little; it augments in bulk, as the ether contains more alcohol. The presence of water is ascertained by placing in a stoppered bottle ether and a little dried chloride of calcium, which dissolves in proportion to the quantity of water present. For photographic purposes ether should always be washed with water to separate the alcohol from it, and afterwards be rectified over some substance having an affinity for water, in order to render it perfectly anhydrous. The formula of ether is C_4H_5O.

EVAPORATE.—To pass off in vapour; to convert a fluid into vapour.—*Spontaneous* evaporation is the term applied to the gradual drying up of most liquids when exposed to the air, and is in contradiction to the more violent and rapid process of evaporation by ebullition.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

IN the amateur's first attempt at manipulation, he should be content with producing something simple and easy to manage. A dish or tray, for instance, will present few difficulties. There are two or three modes of making these, which we will describe. The first we will give in the words of Mr. Osborn, of Birmingham, who recommends it to his photographic brethren as an easy and effective method:—"I first mark out the size of the dish I want on a piece of hard wood about a quarter of an inch or half an inch thick; from this mark I then cut the wood with an outward bevel; the bevel must then be smoothed with sand-paper, and all the sharp edges taken off. I then made a frame of wood like boy's slate frame, but bevelled inwards, this is fastened on a smooth slab of wood, and the mould is complete; I then cut off from a sheet of thick gutta percha, a piece rather larger than will cover the hole in the frame; I soften it in boiling water, and having wetted the mould, place the softened sheet over the hole, and press the block in its place with some force; allow the gutta percha to cool and harden, then trim the edges, and you will have a very neat and light dish for any purpose required." This method whilst, doubtless, efficient so far as the result is concerned, has the drawback of being somewhat troublesome, the labour of preparing the mould, unless several dishes of the size are required, certainly exceeding the value of the result, if the manipulator's time be valuable. The use of "hard wood" for the mould also seems unnecessary, as it increases the labour without giving additional value to the result; wood with a smooth grain would be necessary to secure neatness; but this may be secured in wood comparatively soft and easy to work: perhaps a piece of pine would answer the purpose best.

Another method involving less trouble, but requiring a little care in manipulating in order to secure neatness, is as follows: procure a piece of wood the size of the inside measurement of the dish required; if for a half-plate size, the wood should be about 7½ inches by 5½ inches, and about three quarters of an inch thick; finish it as smoothly as possible: the edges, which are to form the mould for the bottom of the dish, should be neatly rounded off, and the corners treated in the same manner. This is to serve as a mould; if required, a projection of the requisite shape may be left at one corner to form a lip or spout from which to pour; this will, however, increase the trouble of making the mould, and the same result may be produced in a simpler manner, which we will describe in its place. A piece of sheet gutta percha from one-sixth to one-fourth of an inch thick is to be cut of the proper size. Here we must digress a few moments to speak of a peculiar characteristic of gutta percha, which will at this stage of the process often embarrass the amateur somewhat.

It would seem a simple thing enough at first sight to cut a piece the proper size and shape; for the size of which we are speaking, 7½ inches by 5½ inches, with three quarters of an inch for the depth of each side, would give the required size of the piece of sheet as 9 inches by 7 inches. Having cut a piece of this size, however, and placed in water of the requisite heat, our amateur will be astonished to find it in a few moments changing its shape; possibly, from nine inches in length it rapidly extends to ten, eleven, or twelve inches, and at the same time from seven inches in width, it contracts to four or five inches; or the contraction and expansion may be in the other direction, the length decreasing, and the breadth increasing, so that the oblong is rapidly changed to a square. This characteristic seems to arise from the fact that gutta percha in the process of rolling into sheets acquires a fibrous character, as may readily be seen by examining a piece of the very thin sheet, a strip of which will resist very considerable tension when pulled in the direction of the fibre, that is the direction in which it was rolled; but the slightest tension in the opposite direction is followed by a rupture, dividing it again into narrower slips. Under the action of sufficient heat to render it plastic, this fibre contracts in length, and expands, in like proportion, in breadth; this takes place without any material alteration in thickness. It will be seen, then, that before cutting a piece of any required size for manipulation, it is important to ascertain the direction of the fibre: this may generally be done by observing its appearance, the surface of the sheet generally

showing a slight trace of grain or texture in the direction in which it has been rolled. If any doubt exists it may easily be set at rest by cutting a small piece, marking its relation to the length and breadth of the sheet, and immersing it in boiling water; the contraction in one direction and expansion in the other, which will rapidly take place, will indicate the direction in which it has been rolled. In cutting a piece for the dish, it will be necessary to allow a little additional length in the direction of the fibre which will run up, and to cut it a little less, in the opposite direction, which will expand. The exact amount of such allowance must be ascertained by experience, which will easily be attained in one or two experiments.

Having cut a piece the proper size and shape, or at least which will become so when heated, a large vessel of hot water should be at hand. To avoid the chance of any water being absorbed, it should never be suffered to reach a boiling heat. Water boils at 212° Fahr.; for this purpose it should not exceed 200°, nor should it be allowed to fall below 140°, as below that heat the gutta percha ceases to be sufficiently plastic. If a thermometer be not at hand, a sufficiently near approximation will be obtained by taking the water from the fire at boiling heat and pouring it into a vessel for use; the heat it will part with by doing this, will reduce it to about 200°, from which it will rapidly fall in a minute or two to about 150°, just allowing time for the immersion and softening of the gutta percha before it is too cold. The piece of gutta percha now thoroughly softened, must be quickly lifted from the water and placed on the mould in the right position. The mould should be previously made wet to prevent the gutta percha from adhering; soap and water are used for this purpose by the Gutta Percha Company. The edges should then be pressed down with the fingers, carefully working the plastic mass with the fingers and thumb round the corners of the mould; unless some skill and attention are used here there is danger of working it too thin and losing strength at the corners. If the manipulator has been dexterous, he will have succeeded in working the softened sheet into the required shape before it has cooled; if any part be uncompleted when the gutta percha has ceased to be sufficiently soft and tractable, that part only may be again dipped into sufficiently hot water and worked to the proper shape. In a few minutes it will be cool and hard, and may be removed from the mould. The edges should be trimmed with a sharp knife, the blade of which should be dipped in water to prevent the bite of the gutta percha on its surface. A lip may be given to any of the corners by slightly softening in the hot water and working it to the proper shape with the finger and thumb.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 12th July, 1859.

PHOTOGRAPHIC news is rare in Paris at the present moment; last Sunday week we had 32° (centigrade) in the shade, whilst at Madrid about the same date they had only 29°, and hot weather is prejudicial to hard work. Some of the papers are only just beginning to publish M. Perier's report on the Duc de Luyne's prize, which your paper published nearly a month ago. If anything new comes out in France, it is generally known in England about a fortnight or so before the French know it themselves!

At Paris we have a M. Lafon de Camarsac, who believes himself to be one of the first—if not the first—who discovered the carbon process, which has excited so much attention lately. In a day or two I shall forward to you a proof obtained by this gentleman, that you may judge to what perfection he has pushed this new method of photography. How M. Lafon has been so backward with regard to the Duc de Luyne's prize, I cannot explain. It would appear, however, that though his method of operating was published in the *Comptes Rendus* of the Academy of Sciences here, as early as 1855, he, unfortunately, had not applied it to produce *carbon* proofs, but only to different coloured pigments, such as red ochre, oxide of cobalt, manganese, &c., with which he produces proofs of all kinds of colours, somewhat in the style of those exhibited this year by M. De Beauregard, which I mentioned in my letters concerning the Exhibition of Photography. M. Lafon is the author of those curious photographs on porcelain and on enamel, which figured at the Exhibition in M. Disdéri's case, and which I spoke of in my former letters, as being produced by Disdéri. The *Cosmos* of this week gives a long article, which will doubtless appear also in your columns, on the positives obtained by M. Lafon.

The same paper publishes a new memoir by M. Edmond Becquerel, on certain phosphorescent effects: it forms the continuation of the article published a few weeks ago in the "PHOTOGRAPHIC NEWS;" and embodies a mass of experiments on the light emitted by bodies after they have been exposed to the sun, or after they have been rendered luminous by electricity.

M. Poey has sent from Havana two long papers, on the colours of stars, planets, &c., according as they are viewed at the horizon or at the zenith. If his observations are exact, it would appear that a star viewed at the horizon has a red tint, which is replaced successively as the star rises in the heavens, by orange, yellow, green, blue, indigo, and finally, when at the zenith, or its greatest elevation, violet. The zenith point once past the star undergoes an inverse colouration as it descends towards the west, and sets with the red tint it had on rising.

These observations appear probable enough; but it is not so of those inserted in the second paper, in which the colouration of the borders of the planetary solar and lunar discs are studied. If the sun or the moon, for instance, be viewed when the atmosphere is very dense, the lower border appears of a red tint, the superior one of the complementary colour—violet. When the luminary is about half-way between the horizon and the zenith, it presents, according to M. Poey, the whole seven colours of the spectrum, divided into two groups, which are separated by a central band of pure white light. I am tempted to believe that these results are due to an optical illusion. If the moon is viewed through the hand, as we sometimes view a picture, or through a small paper tube, one of the arcs of its disc will appear of a reddish colour, the opposite one taking the complementary blue or violet, and, by a little manœuvring with the tube, it is not difficult to make first one border and then the opposite one take the red or the violet hue.

Boëttger has published the following receipt for making liquid glue, which may, perhaps, be found useful in the *atélier* of a photographer. For some time past a species of liquid glue has been known in commerce; it is obtained by treating common glue or gelatine with nitric acid. But nitric acid is dear and poisonous; it may be dispensed with. According to Boëttger, it is only necessary to dissolve the glue in very strong vinegar with the aid of the water bath, a fourth part of alcohol and a little alum being added to the other ingredients. The product remains perfectly liquid, and is exceedingly useful for glueing small objects of ivory, bone, horn, wood, &c. I do not think Boëttger is the author of this discovery, as I have frequently bought, in Paris, liquid glue smelling strongly of vinegar.

M. Pelouze has referred again to a discovery formerly made by Bracconot, the once celebrated chemist of Nancy, viz., that strong mineral acids may be used to convert starch, wood, linen, &c., into sugar. This discovery of Bracconot's is largely applied, in this country, in the manufacturing of wine. When the juice of the grape does not contain enough sugar to produce a wine strong in alcohol, sugar made from potato-starch is added and submitted to fermentation. M. Pelouze says that paper, linen, woody fibre, &c. will dissolve in a few minutes in hydrochloric acid. If, immediately after the dissolution is accomplished, water is added, the whole of the cellulose dissolved is precipitated in a pure state; but if the solution has been allowed to stand for 24 hours or so, it is found that the entire

quantity of cellulose has been transformed into glucose or grape-sugar. The same author thinks that if the phenomena which take place during this transformation were properly studied, it would lead us to solve the problem of converting woody fibre into an alimentary substance.*

A late number of the *Annali di Chimica*, of Milan, publishes, without any author's name, a new method of obtaining *caffeine*, the active principle of coffee *and tea* (for theine and caffeine are looked upon as one and the same substance). This method consists in treating finely-pulverised coffee with benzine, such as is sold in commerce to clean gloves, &c. Benzine dissolves the essential oil of the coffee and the caffeine. The liquid is then evaporated, and the two substances, the oil and the caffeine, are easily separated by boiling water, which dissolves the latter, whilst the oil floats on the surface of the water. The aqueous solution, when evaporated carefully, gives beautiful crystals of caffeine, which may be, moreover, thoroughly purified by sublimation.

At the last meeting of the *Scientific Congress of Carlsruhe*, of which Professor Nicklès, of Nancy, has given us such a delightful account in his little *brochure* published a short time ago, Boëttger repeated the curious experiments which illustrate Albert Fuchs' discovery of the effects of electricity on small columns of water. If a small jet of water be passed through an aperture so small that a pressure of 12¼ inches only causes it to rise 28 inches high, the jet is divided into a considerable number of small drops which fall very near the aperture, and describe parabola having a very small parameter. If now any substance electrically excited, for instance, a glass tube that has been rubbed with silk, be brought within a short distance of the jet, the drops disappear and the water is discharged in a continuous column, even to the top. If the excited substance be placed very near, the jet is dispersed in excessively fine drops; if the glass tube is held near the top of the jet, the drops unite into larger ones, and if it be advanced towards the basis of the jet, the height of the little fountain is considerably diminished. A jet of water, suitably arranged, can be made to acquire an extraordinary electric sensibility, greater even than that of a gold-leaf electrometer. Fuchs caused the jet to assume a continuous form, by placing himself about 12 inches from it, and simply passing his hand through his hair for a short time. The distinguished professor explained these curious phenomena in the following manner:—

The dispersion in drops of the original jet is the purely mechanical effect of the adhesion of the water to the sides of the aperture, combined with the greater freedom of motion possessed by the molecules of water placed in the axis of the jet. If the electrical bodies be removed to a distance, the molecules, in a separated, isolated, and neutral state, are electrified by influence, and, by virtue of the polarity thus acquired, attract each other and unite to form a continuous column. If, on the other hand, the excited material be placed near the jet, the entire mass of the water is strongly electrified by the *same kind* of electricity, and, consequently, the drops of water repel each other, for electric repulsion is now added to the mechanical dispersion caused by the aperture.

You would laugh heartily if you only knew to what a climax the discussion as to the possibility of the resuscitation of dead—or apparently dead—animalculæ has been pushed within the last few months in France. Here is the actual state of the question:—

It would appear, from some old experiments made by Spallanzani, that certain *Rotifera* and *Tardigrades* can be completely dried up, so as to resemble a grain of flint or an atom of hard, dry parchment, and yet, when moistened with water, the animalculæ are restored to life! M. Doyère, of Paris, repeated these experiments with success many years ago, and the fact was looked upon by naturalists—even by the great Humboldt—as incontestable. It has been, however, contested very sharply indeed by M. Pouchet, of Rouen, who declares, as I mentioned in my first letter to the "PHOTOGRAPHIC NEWS," that no animalculæ, when properly dried, ever return to life. His assertions are based upon numerous observations, in which he has been aided and abetted by M. Georges Pennetier, and some other naturalists, who all declare that the motions observed in dry animalculæ, when they are moistened with a drop of water, are purely mechanical, being an effect of endosmose; the liquid is absorbed by the dried animal substance which is thereby swollen, but no vital action takes place.

M. Doyère denies these assertions, and still puts implicit faith in his former observations.

The discussion has gone so far that the naturalists of the Rouen Museum have offered a prize of 500 francs to be awarded to the person who shall be able to resuscitate a dried animalculæ!

At this juncture M. Davaine, a naturalist of high standing, has endeavoured to prove that the animalculæ in question must be divided into two sections perfectly distinct: the one, composed of those *Infusoria* which inhabit our stagnant waters, and which are, consequently, always imbibed or saturated with the element in which they live; the other, embracing those animalculæ which are to be found in the gutters, on the roofs of houses, in bunches of moss, &c., and which are naturally subject to be dried up every now and then by the sun's rays, from want of moisture in the localities they inhabit. According to M. Davaine, the former section cannot be submitted to dessication without losing their lives; but the latter, especially those taken from the roofs of houses (which were those experimented upon by Spallanzani), may be submitted to a temperature equal to that of boiling water, and return to life again on being moistened.

Up to the present time, however, the question is far from decided, one way or the other; the discussion still continues. We all await anxiously its result.

[With respect to the carbon printing process alluded to in the second paragraph of the above letter, we may add that we have received a carbon picture from our Paris correspondent, which was handed to him by M. Lafon de Camarsac. The picture in question is a portrait of a young French lady, and the manner in which it is reproduced is quite astonishing. The lights and shadows are rendered with the most perfect delicacy, and in a manner which could not be surpassed by the silver process. Every wave of the hair is depicted with the most extreme accuracy; the eyes are full of intelligence, and every feature is given with a minuteness which we never saw surpassed. At the time when so much was said about a carbon process which had been discovered, we pointed out that, judging from the specimens of carbon printing exhibited, it would be impossible to print a satisfactory portrait from a negative by its means, the coarseness of the carbon preventing the proper rendering of the half-tones. That we were right in this opinion may be inferred from the fact that no such picture has been exhibited; but that carbon can be employed in such a way as to give the most satisfactory results, is amply proved by the portrait before us. It is evident that M. Lafon gave his entire attention to the production of the portrait, without paying very much regard to the accessories, or he would have insisted on a reduction in the amplitude of the skirt of the dress, which detracts from the otherwise graceful posé of the sitter, and is made more manifest than it might be under other circumstances from the contrast it presents to the slender figure of the lady. What M. Lafon's motive may have been for not competing for the Luyne's prize we are unable to say, but we have no sort of doubt that if the print forwarded to us is a fair average specimen of those taken by his process, that he will stand first at the next competition, unless great improvements are made in the processes hitherto published.—ED.]

* These phenomena have of late years been subjected to investigation by Dr. T. L. Phipson, of Paris, in his work *De la Force Catalytique, &c.*, to which a gold medal was awarded last year by the *Société Hollandaise des Sciences*, of Haarlem, and previously in his *Memoire sur la Fécule et les Substances qui peuvent la remplacer dans l'Industrie* (Bruxelles, 1855-6).

A PHOTOGRAPHIC TRIP UP THE WYE.

Sir,—At the present moment, the most interesting subject to photographers is the consideration where they shall spend their holiday, and I think, therefore, I shall be doing them a kindness by sending you for publication an account of my trip up the Wye, which I think will be sufficient to prove that of all places in the kingdom there is none which offers more advantages to the photographer than this.

The beauty of the scenery on the Wye is so well known by reputation, that it is unnecessary to dilate upon it; I shall, therefore, confine myself chiefly to those objects which struck me as being sufficiently remarkable to be photographed.

Instead of coming down the river, as is the ordinary practice, I decided on sailing up it, as I was not quite sure that time would allow me to visit all the interesting places on the river, and my friend, whose boat I borrowed, had told me that the best subjects for photographs were to be found near its mouth. The mention of a boat need not induce your readers to imagine that such conveyance is absolutely necessary; it is no doubt an advantage, and, at times, advisable, but there are paths alongside the river nearly all the way. I may mention, too, before I go farther, that the cheapest, and, as I think, the best way of reaching the spot, for him who starts from London, is to go by the excursion train to Bristol, and then he will be able to get across to Chepstow without difficulty, and commence his upward journey.

Chepstow itself being the beginning of my journey, I was rather more lavish of my plates than I should probably have been if it had been the termination of it; but I am glad of it now, as the trouble is forgotten and the negatives remain. The old castle was the first object which attracted my attention; of this I took three views—one of the arched entrance, including the two large round towers and a portion of the ruins on either side, one of the opposite side, and the third of the end which approaches the cliff, on the top of which I placed my camera. I have always considered that the pleasure one derives from the possession of a picture is greatly enhanced where a legend or a historical recollection is associated with it. Thus the negatives of these ruins remind me of the time when the castle was besieged by the parliamentary forces under Cromwell, in the time of Charles I., when a small body of royalists defended it against them until nearly a third of their number, including their commander, was killed, and the remainder all but starved. The keep is generally called Marten's Tower, from the circumstance that Marten, who was one of the judges who tried Charles I., was imprisoned here after the restoration, for twenty years, until he died, when his body was laid in the chancel of Chepstow church, until one of the vicars, feeling greatly scandalised that a regicide's bones should rest so near the altar, had them taken up and buried in the nave. I tried to take a picture of the cliff and a part of the ruins from the river, but failed to get one that was satisfactory, in consequence of the slight motion of the boat.

We left our apparatus in the care of the boatman while we visited the grounds of Piercefield, as it was getting too late to think of taking a picture, and, moreover, the view, though most beautiful to the eye, is not calculated so well for a photograph. Nothing can be more delightful than the walk along the paths on the top of the cliffs. The sun was getting low when we commenced our walk, and no words can express the beauty of the views, which extended for miles. The scenery through which the river takes its course was bathed in as rich hues as ever met the eye in an Italian landscape; and every now and then as the path wound along, near the top of the cliff, we caught glimpses of a scene diversified with the ruins of the castle, or the town itself with the bridge and port and the large vessels which lay stranded therein, left there by the receding tide, which I was told rose here to a height of fifty feet.

It was getting dark when we reached the end of our walk in these grounds, so we deferred our visit to Wyndcliff until the next morning. Partly, perhaps, from our not seeing them under the garb of sunset, they did not strike us as being equal in beauty to those of Piercefield, but they are, nevertheless, of wondrous beauty. There is one view in special which I would advise none of your readers to miss seeing who may decide on going to this part, and that is the view from the highest cliff, which is little less than 800 feet high. It is said that from it you obtain a view which includes portions of nine counties; of the truth of this statement I can say nothing, except that it struck me as being very likely. On the one hand, we could see the estuary of the Severn with the country beyond, and the whole of Chepstow and the ruins of the castle, with the cliffs and woods of Piercefield. In another direction we could follow the course of the Wye through a less rich country, the background of which was formed by the dark mountains, forming a view of quite a different character to the first, beside many other views varying in their general features, but remarkable for their beauty.

After drinking some water in the little moss-covered cottage at the foot of the steps which lead to the summit of the cliff, we returned to our boat and sailed slowly up the river until we neared Tintern Abbey. To take a picture of this far-famed spot was, of course, a predetermined resolution, so while my friend remained to take care of the boat, the boatman loaded himself with my apparatus, and we proceeded to the Abbey. No matter from what point of view you look at the ruins, it is worthy of being photographed, and I hardly know any place which furnishes prettier pictures for the stereoscope. I took several negatives, and among them were some for the stereoscope, which I prize very highly, two of which are pictures of the interior of the ruins. I worked here four hours, and am more satisfied with the results of my labour than with the results of any four hours' work either before or since. To see Tintern Abbey by moonlight is one of the finest spectacles the eye of man ever rested upon, and we were fortunate enough to obtain this view; for feeling that I had done quite enough for one day, we decided on staying where we were for the night, and visiting the ruins after we had dined, and I would recommend any photographer, who happens to be there when there is a moon, to do likewise.

On leaving Tintern we did not stop, except to take an occasional picture, until we reached Monmouth. The distance by land is, I believe, not more than five miles, but it is considerably more by water, I imagine, judging from the time it took us to get there. The town of Monmouth itself only yielded two good negatives, one of which includes the remains of the old gatehouse, at the extreme end of the town; but the town is, nevertheless, very beautifully situated; and I dare say we most of us remember the enthusiastic manner in which Fluellyn speaks of it, when referring to the birthplace of Henry V., and compares it with Macedon, the birthplace of Alexander the Great:—"If you look in the maps of the world, I warrant you shall find, in the comparisons between Macedon and Monmouth, that the situations look you is both alike. There is a river in Macedon; and there is also, moreover, a river at Monmouth; it is called Wye at Monmouth; but it is out of my prains what is the name of the other river; but 'tis all one; 'tis so like as is my fingers to my fingers, and there is salmons in both." Whether the same point of resemblance still exists I can't say, but certainly "there is salmons" at Monmouth, for we had an excellent specimen of that fish at our dinner.

The day after we arrived here we hired a trap to drive over to Raglan Castle, the ruins of which are described as being very fine, and of which I hoped to get some good negatives, but, unfortunately, it began to rain in a way which compelled us to turn about and come back before we had got a mile on our journey there, and as I could not well spare another day for the purpose, I lost the opportunity of getting a picture, which I much regret.

The next morning we left Monmouth, and had the pleasantest sail imaginable along the river. The scenery, for

the first two or three miles, is of that character which, to be thoroughly enjoyed, should be viewed through the smoke of the after-breakfast cigar, unless, indeed, the photographer is fortunate enough to have a fair assistant with whom he can exchange opinions, and consult as to the selection of a view. It is quiet and beautiful, and it is not until you are some distance from Monmouth that it presents an appearance which tempts you to land for the purpose of taking a picture. One of the prints which I forward to you by the same post which carries this letter will, I think, satisfy you that few places in England are better worth taking for the stereoscope or otherwise, than the Coldwell Rocks.

The grandeur and picturesque appearance of this part of the river cannot, I should think, be surpassed anywhere, not even in foreign countries, where so many English go who are almost entirely ignorant of the beauties of their native land. The picture was taken from the bed of the river, on one of the shallows of which I pitched my camera. I have three other negatives of different portions of the same rocks, but I have not yet had time to print from them, but as soon as I do so I will forward you proofs. They were not taken without difficulty, owing to the unstable character of the bed of the river, which interfered with the planting of the tripod, so as to get a perfectly level table for the support of the camera.

As my letter has already extended to some length, I shall defer the remainder until another week.—Yours obediently,

R. A. W.

Miscellaneous.

* * * * There are other aspects of this wonderful art. We may look at it from a point of view in which it will seem little else than a ghastly misrepresentation of nature, little more true in reality than was that automaton doll with an artificial voice, exhibited a few years since in London, which only sufficiently represented the sounds of the human voice to prove how immeasurably transcendent was that supple organ of natural intonation to the most refined mechanism that could be framed to imitate it. We have alluded to the great failure in the photograph in the representation of colour, however exact and minute may be its delineation of details. In point of fact, the photograph represents but two colours out of Newton's seven, and takes cognisance of but one extreme of the series of manifold lines of the rainbow. If a line of direct sunlight be admitted through a small hole into a dark room, an image of the sun will be formed on a screen at some distance from the window. If a prism be interposed in the path of the ray instead of an image of the sun, there will be an indefinite number of these as though overlapping each other and forming a long oval, each being refracted out of the direct ray a little more than the one it overlies, and each is of a different colour. Thus the red is the least diverted image, while the violet is in situation the most remote from the direction of the original ray. The bit of rainbow which these, in fact, indefinite number of successive images of the sun combine to form is the so-called *solar spectrum*. Of the whole range of its myriad lines the eye sits in judgment on a comparatively small section, the visible spectrum, extending from a deep red to the almost lavender tint, being much less than one-half of the whole; for colour is not the only attribute of the light thus analysed into its component tints; to each angle of refrangibility, indeed—that is to say, to each degree of divergence from its original direction which the several strands of the thus unravelled thread of light will take—belong a series of attributes. The radiant heat, the light, the multifarious chemical agencies seem to be but so many phases of this one wonderful vibration, which even in its invisible attributes we must include under the general name of light, or of solar radiation; and the separation of these characteristic expressions of solar force from each other is a problem which science as yet, at least, has not in any manner solved. The particular class of chemical forces that are operative in the production of the ordinary photographs resides almost entirely in the portion of the light which vibrates most rapidly, and extends when dispersed in the rainbow form from the indigo and through the violet into a long space, wherein the eye detects no light at all; so that the very light which the human eye cannot see is the illuminating influence by means of which, for the most part, the eye of the photographic camera looks out into the world. If we can picture in our imagination the effect upon our own senses of a beautiful scene which we should look on with an eye that saw not colours as we see them—to which red, and yellow, and green were as darkness, and the only apparent colours of the garb of nature were dark blue and violet, and a long range of tints passing through lavender into a series of hues that eye hath never seen nor the mind conceived of—then, indeed, we form a notion of the sort of view which the camera represents to us by the photograph. To the photographist, then, all the most luminous, the most cheerful, the most varied hues in nature, are as the outer darkness; their effect on the photographic compounds he employs is comparatively nothing; and the view his picture represents is, in fact, impressed on his sensitive surface by rays, for the most part of too high refrangibility to be visible. It is hardly strange, then, that the delicate blush-red on a lovely cheek should be in the photographic portrait as though it were a dark stain, or that the golden eye of the water-lily should come out from the collodion plate as a black mass in the midst of those snow white petals; that the primrose or the rose, "embowered in its own green leaves," should present no contrast between its petals and their lovely fringe; or, again, that the sweet "pleasant green" of foliage, that the eye so loves to dwell on, should need a prolonged exposure to afford time for the ordinary light that is dispersed from the leaf surfaces to operate the chemical change which the abundant green light itself is unable to effect. On the other hand, no one can understand, with this explanation on one's mind, why, in an ordinary photograph, a blue sky should be so intensely white, while the green tree, however brilliantly illuminated, is a black mass in comparison. Indeed, the wonder is that one can look at a photograph with any patience at all, and that we do not instinctively recognise the broad gulph between the *chiaro-oscura* of the silver picture and that of any sepia drawing that would depict with at all faithful relations of intensity the impressions made on the eye by the gradations of light as seen through the medium of colour.—*National Review*.

The Pleasures of Photography.—Here is an art in which success brings exquisite enjoyment, and whose very reverses are full of interest. An art easy of acquirement—a Piërian spring, at which you may sip or quaff deeply, according to your fancy. How many a fallow brain, over which the weeds of spleen and ennui grow rank and luxuriant for very lack of employment, would again revert to profitable tillage with such a hobby to draw the plough? How many a right hand which at present knows no higher use than to be a stretcher of kid gloves, and which would draw back from the maculation of *lunar caustic*, as from contact with a plague-spot, would find its cunning, and rejoice at the discovery, as it manipulated a plate, or adjusted a focus? In this pursuit, how many a puny limb and flaccid muscle might become tough and brawny? How many a contracting chest and failing lung might experience, for the first time, the invigorating influence of that pure oxygenisation which is only to be found "over the hills and far away?" Nay, may we not even ask, How many a purposeless life, by assuming this "shadowed livery of the burnished sun," might thus find an object, and in its health-bestowing, soul-expanding service, realise the fact, that "life is earnest," and progressing always, *Excelsior*, *Excelsior*, go on to discover aims even higher and nobler than those which are to be found in the atelier of the sun.—*Irish Metropolitan Magazine*.

The Present High Temperature.—The temperature of the last three or four days has been the highest we ever remember to have experienced. On Tuesday a black bulb thermometer placed in the sun, rose to 146°, and we were obliged to cease from our endeavours to register photographically the amount of actinic radiation in consequence of the collodion boiling on the plate,—a fact we never before met with, even when working in a close tent. On the following day the heat was even greater; the same thermometer indicating at least 10° higher in the sunshine at noon. A bottle of collodion beside it boiled violently, and a portion of it poured on a piece of metal which had been exposed for a few minutes to the direct rays of the sun hissed as if it had been poured on red-hot iron. The amount of actinic radiation on Tuesday, as

far as we were able to record it, was greater than we have ever known it before. Nor is this excessive heat confined to this country; our Paris correspondent informs us that in that city in the shade, the thermometer rose to 95° on Tuesday.

Photographic Notes and Queries.

THERMOGRAPHY.—GREEN, BLUE, AND PURPLE PHOTOGRAPHS.

SIR,—Seeing a copy of your Journal, for the first time, a few days since, I found in it an article by M. Niépce de St. Victor on the power of caloric in developing photographic images. I was surprised to find that it was considered anything new, as I made the same discovery some four years since, but was not aware at that time but what the same thing had been noticed before. I was led to think, whether or no heat had not something to do with the development of images on sensitive paper, by seeing a friend who used for a hair dye a solution of ammonio nitrate of silver, hold a hot iron near enough so as not to burn the hair, which caused it to assume an intense blackness. Reasoning from this fact, I thought I would see what effect heat would have upon sensitive paper, through a negative. Having salted a paper with chloride of ammonium, and afterwards floated it upon a solution of ammonio nitrate of silver, I placed my negative upon it, and exposed it to the heat of a stove for several minutes, and on removing the negative found an image impressed upon the paper. This experiment I repeated several times, but not thinking the results so satisfactory as those by light, I gave up any further experiments in that direction, with the exception of some I made about three years since, on varnished glass plates. I found that if a glass plate be coated with varnish of any of the common hard kinds, and a negative *not* varnished be placed in contact with it, and exposed to a moderate heat for some time, that an image was impressed upon the varnished plate. I fancied that Sandarack varnish was more sensitive than others. In the same paper (No. 39, vol. ii.) I find an article, by the same gentleman, on the use of nitrate of uranium in photography, in which he shows how a green photograph may be taken. I have found that a green may be produced without the aid of chemical re-agent, but by the action of light alone, by using a sensitive paper, made after the following formula:—Take a saturated solution of bi-chromate of potassa, acidulated with sulphuric acid and a solution of ferrycyanide of potassium; mix the two solutions and let them stand a few hours to settle; then, pour off the clear liquid, and float your paper on it. When dry it will be of a light straw colour. Now, place it under your negative, and expose it (if a clear day) for fifteen minutes; remove it from your frame and wash it in boiling water, and dry. I have now in my possession prints taken thirty months ago, which have not changed in the least. The colour is like that of oxide of chromium. I have made numerous experiments with ammonio citrate of iron, which is as much superior, in my humble opinion, to all other known sensitive agents, except nitrate of silver, as the latter article is to bichromate of potassa. I have prints taken with this article which stand the test of time better than any I have ever seen by any other method. With it, and by the use of re-agents, tones and colours can be produced which I have never seen done by any other article. Thus, in a landscape, the sky can be blue or purple, giving the effects of sunset, the foliage green, and so on, according to the knowledge and skill of the operator. This was, no doubt, the manner in which prints, exhibited by Beauregard, in 1855, were done, and not, as he said, by direct printing. If you consider this from an amateur of enough consequence to print, I may, in a future paper, give you the results of my experiments with this article.

New York. JESSE HARDING.

[We shall receive with great pleasure an account of our correspondent's experiments with the ammonio citrate of iron, as mentioned in the latter part of his letter. The above experiments are very curious, and will be read with great interest by all scientific men on this side of the Atlantic. We recommend them to the careful attention of those of our readers who are of an experimental turn of mind, as being well worth repeating.—ED.]

EMPLOYMENT OF GLYCERINE IN PHOTOGRAPHY.

SIR,—As you were so good as to insert a few remarks of mine, on some of the uses of glycerine, in No. 42 of the "PHOTOGRAPHIC NEWS," may I ask for a small space in your columns for a few more observations on the same subject? as I hope and believe the experiments I have lately made may be of use to others working in the same direction.

I find if a developed collodionised plate be allowed to dry, and is subsequently moistened, and heated with the glycerine solution, the operation of "strengthening" is equally easily performed—the film remaining uninjured by the redeveloping and the necessary washings.

In the various dry processes I am sanguine that the use of glycerine, first moistening the plate and then pouring on the glycerine before the development is begun, may be the means of saving many valuable negatives, as it has the singular property of penetrating the film, rendering it tough, and preventing it "splitting off."

I observe, in one of your contemporaries, objection is made to its use, on its score of fogging the plate. This, during many months' trial, has never occurred to myself; and I have this morning intensified a portrait, taken a fortnight ago, with complete satisfaction—the plate having been coated with glycerine all the time. I should, however, suggest, as a possible cause of such a *contretemps*, the omitting to displace the iodide with cyanide or hypo. before the use of the glycerine.

I prefer a weak solution of cyanide for fixing; and, need scarcely add, I very thoroughly wash. R. M. S.

FRESH OR STALE EGGS FOR PREPARING ALBUMENISED PAPER.

SIR,—Being in the country a short time back, I thought I would avail myself of the opportunity of procuring fresh eggs to albumenise some paper. I had succeeded tolerably well with those we obtain in London, but I expected to be doubly successful with what the country affords.

I was, however, a good deal surprised and annoyed to find that my paper—though glossy enough—became perfectly *red* on the morning after sensitising, though operated upon and afterwards kept in the dark room. In the course of a day or two it became perfectly black, though light had been carefully excluded.

I used pure albumen—the eggs new-laid—and five per cent. of ordinary salt.

As I have frequently kept paper of my own albumenising a week and more without discoloration, I shall be obliged by your assisting me to account for my failure in this instance. I may add, that the paper was perfectly dry, and all foreign particles excluded from the albumen—the bath being 80 grains neutral. H. T. T.

[We should like to see this question fully discussed, as we know several very experienced photographers who state, that the result of their experience tends to show, that albumen, used for preparing positive paper, improves if it is kept for some time; and some have even gone so far as to say, that they prefer it in an incipient state of decomposition.—ED.]

MATERIAL FOR LARGE WASHING TRAYS.

SIR,—I am about to put up a large cistern, and want a lot of large trays to wash prints in, so as to get a running stream of water from the cistern. I thought of making them of wood, and lining them with either lead or zinc. Would

there be any objection to the use of either, or which would be best, or what would you recommend? They will be some two or three feet long, and as I want a continuation of them, with taps, &c., in, I do not know what else to use.

A BATHONIAN.

[Neither lead nor zinc will answer the purpose very well, as these metals will decompose hyposulphite of silver in the fixing bath with precipitation of silver as a black mud. For the *last* washing dishes, when the liquid may be considered as nearly free from hypo., these metals might not be injurious, but we do not recommend them. Either gutta percha, slate, or even wood alone, would be preferable.—ED.]

DECOLORISING COLLODION WITH METALLIC MERCURY.

SIR,—I had by me a quantity of old collodion, all sorts mixed, positive and negative, &c. It was as brown as the darkest sherry. I shook it up with two or three drachms of mercury; it is now quite clear, very sensitive in the wet process, and the half shades good. This may be a useful hint for others, as I do not remember having seen it mentioned.

M. M. D.

[We are glad our correspondent finds the above plan answer. He will see that we fully described it by referring to our present volume, p. 12.—ED.]

EFFECT OF GUTTA PERCHA BATHS ON THE SILVER SOLUTION.

SIR,—In compliance with your requests relative to the inferiority of gutta percha baths, I beg leave to state, that I have one in use now that I purchased on July 9th, 1856, and it has been in constant use ever since. I have never possessed any other kind than gutta percha; and am confident, that I can produce a picture, either positive or negative, a view or a portrait, as free from fogging, and as clear and vigorous, from a gutta percha bath as from any other kind. I inclose a specimen taken with the bath in question, which has been in use now within a few days of three years.

WILLIAM BOYER.

ANSWERS TO MINOR QUERIES.

CITRATE OF SILVER PRINTING PROCESS.—*F. Collins.* Mr. Hardwich was, we believe, the first who suggested using citrate of silver in printing positives. The advantages are, that the prints are more easily obtained of the peculiar warmth and softness which are so much admired; and to those who prefer the slightly reddish tint which the stereograms, printed by some well-known photographers, possess, we cannot recommend a better process. Several formulæ for a good printing process by this method have from time to time been given in our pages, but if a photographer is already in possession of a good formula for positive printing, he need only modify it to the extent of replacing one half of the chloride of ammonium or sodium which he at present uses in his salting bath by the same quantity of pure citrate of soda. All the other formulæ and manipulations can be employed as in the ordinary process.

PRINTING POSITIVES ON CANVAS.—*H. S. H.* The following method of preparing canvas for receiving photographic impressions has been used for some time with decided success. The process is to mix whiting with alcohol, until a pretty thick mixture is formed; paint this over the canvas with a soft flat brush. When dry, rub off with cotton until all the whiting is removed (which is easily done), and the canvas receives the salt and silver solutions beautifully.

TO CORRESPONDENTS.

THE STEREOSCOPIC EXCHANGE CLUB.—We have received several letters connected with the subject to which we alluded in our last number. One gentleman writes, "I am very glad to see you have made some remarks on 'Fairplay's' letter of complaint. I suppose he was agreeable to the terms laid down in the 'News,' and therefore has no right to grumble. It certainly is all a lottery. I have received a few very moderate things; a great many very excellent ones; and nothing but good-will and civility from *all* the members with whom I have had any communication; and my thanks are due to you, sir, for getting up such an association. I, for one, shall be glad to keep the club afloat; and if 'Fairplay,' whoever he may be, is dissatisfied, let him give his name and withdraw at once." Another correspondent writes, "I am inclined to write a line or two to you in order that (as I think you will admit) you may see that 'Fairplay's' complaints as to the 'Stereoscopic Exchange Club,' are not without foundation. I inclose one of some prints I received, and I must plead guilty of not returning so good a one for the same as I might have done; but still I send you also a print of what I returned, which I think was a fair repayment. In writing this, I do not do so in order to find fault, but that, on the other hand, I may thank you for having carried out the club, as I have received many interesting and good views." Our correspondent proceeds to suggest that, in case of any member receiving a print which he may think very bad, and unfit for purposes of exchange, he should send the same, with his own name and that of the sender, in confidence to us, so that, if we are of opinion that the print is not up to par, we can drop a hint to that effect to the sender. Of course any person is at liberty to make what complaints he pleases. Far be it from us to wish to curtail the greatest privilege an Englishman has—that of grumbling; but we would much rather interfere as little as possible in a matter which ought to be left to the good feeling and courtesy of the gentlemen themselves. We will not deny that the prints complained of are very bad indeed; but, at the same time, we cannot think that the sender was aware of their great inferiority. He is doubtless a young beginner; and, therefore, it would be kinder to send him good pictures, so that he might see his own failings, than, by returning *quid pro quo*, to confirm him in his erroneous impression, that his own productions are equal to the average.

J. S. O.—We think the address, as printed, is the correct one. You have erred, however, in styling the gentleman "Photographer;" and as there may not be a professional photographer of that name in the town, your letter miscarried. We admire the print very much, and shall be pleased to know the particulars you refer to.

G. S.—Your picture, No. 1, has not been exposed long enough. The mark across the plate, near the hands, is caused by your not dipping the plate in the bath soon enough. Of course, where rain water is mentioned, distilled water will answer the purpose—the former only being recommended as an easily procurable substitute for the latter.

R. O. F. S.—If the prints are "rolled" in a rolling press they will not have that tendency to curl up, and the surface will also be greatly improved.

N. N.—The collodio-albumen or Fothergill process will, we think, answer your purpose best, although in neither of these is the surface of the film retained in a moist state.

S. E. S.—Alcohol is not at all necessary in a developing solution, except there be a difficulty in causing it to flow over the plate; in this case it may be added in small quantities at a time, until this difficulty be overcome. The quantity is unimportant, and must depend upon circumstances.

F. YOUNG.—1. You can easily calculate the amount of silver in a given weight of chloride of silver. The equivalent of silver is 108, and that of chlorine 35·5; consequently, as chloride of silver is composed of one equivalent of each of its constituents, the equivalent of chloride of silver is $108 + 35·5 = 143·5$; and, therefore, 143·5 parts of chloride of silver contain 108 parts of silver, the remainder being chlorine. 2. The objection to a portrait combination for landscape photography is, that the centre of the field is liable to be over-done before the side parts. This, however, can be in a great measure remedied by the employment of a small stop in front of the first lens; and, under these circumstances, a portrait combination would do nearly as well as a view lens for landscape photography.

STEREOSCOPIC.—Lenses are made for stereoscopic purposes of as short a focus as 3½ inches; perhaps one of this focus would suit your purpose.

B. A. (CAM.)—1. A lens of 4¼ inch focus can be used, which is ample for covering a stereoscopic plate. 2. Yes. 3 and 4. It is a very good portable form of camera; but of course great durability and strength must be sacrificed to portability. 5. Hardwich.

GEO. R.—Such an apparatus has been described in one of our back numbers. We shall, however, be glad to see your idea.

F. L. G.—Increase the strength of the fixing solution.

SALOP.—The fault must be in something you have omitted to describe. From what you say, everything has been prepared, and should therefore work in the most perfect manner.

A. ROSS P.—Paint the inside of your glass room a light blue colour.

JOHN T.—We continue to hear very good accounts of the Company's dry plates, but have not lately tried any. We can give no idea of the probable time required for exposure in the case of the dimly-lighted screen. It might vary from 10 minutes to some hours.

C. KEMP.—We think the bath is too weak; try the effect of adding a quarter of an ounce of nitrate of silver to it. That may remedy it; and in any case will improve it. If, however, it does not entirely remove the effect complained of, change the collodion for some other sample.

J. C.—Wash them well in boiling water, and then rub with a hot cloth until the greater part of the wax is removed from the funnels and dishes, and finish with soap and hot water. If any particles of wax resist this treatment, soften them with a drop of turpentine or benzol.

H. H. C.—There is no particular formula required for obtaining negatives. Use good collodion, prepared for this purpose, and a negative developing solution prepared with pyrogallic acid. The bath may be the same as for positives.

J. W. WELCH.—The occurrence of pin holes in the dark parts of dry collodion negatives is a very common annoyance. Several things may give rise to them, such as using an over-iodised collodion, or one which has not thoroughly settled. A potassium collodion is especially liable to this occurrence. If the bath is at all turbid, or if dust has settled on the plates, pin holes may occur, and they not unfrequently come when every imaginable precaution has been taken to guard against them; consequently, we suppose we must admit, that nothing much is known about the circumstances upon which depends their presence or absence.

Communications declined, with thanks.—An Old Mechanic.—Nemo.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—W. C. C.—In a Hobble.—F. R. O. Y.

IN TYPE:—S. E. C.—F. Hardwich.—F. L.—J. Jopling.—J. F.—Artisan Amateur.—Viator.—G. H. W.—Peter Positive.—H. and J. Walter.—T. Warwick.—B. C. H.—M. A. Root.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 46.—*July 22, 1859.*

THE ACTION OF THE SOLAR SPECTRUM UPON CERTAIN COMPOUNDS OF SILVER.

BY SIR J. F. W. HERSCHEL, BART.

IN the article headed "Miscellaneous" of the "PHOTOGRAPHIC NEWS" of the 15th instant, I find it stated that "the particular class of chemical forces that are operative in the production of the ordinary photographs resides almost entirely in the portion of the light which vibrates most rapidly, and extends when dispersed in the rainbow form from the indigo and through the violet into a long space, wherein the eye detects no light at all;" and, farther on, that "to the photographist, all the most luminous, the most cheerful, and the most varied hues in nature, are as the outer darkness."

If this statement, which is extracted from the *National Review*, and which I am aware is only a somewhat exaggerated one of the ideas generally prevalent on the subject, were to be accepted as a just representation of the conditions under which this noble art produces its miracles, it would certainly be a great discouragement to those who hope one day to see colour depict itself, and who, at all events, look to see the tones of a finely-coloured picture as well rendered by photography as by the engraver's art. Entertaining, myself, up to a recent period, a notion that this evil was a necessary concomitant of the use of iodine as a photographic agent, connected with the exceedingly curious and peculiar difference of its action under certain circumstances, on the rays on either side of the indigo of the spectrum, I was led to propose (vide *Journal of the Photographic Society*, No. 6, p. 70, June 21, 1853) the abandonment, or at all events, restricted use of iodine in photography; and the substitution of bromine "*coûte qui coûte.*" Of late I have seen reason to alter my opinion on this point. *Voici pourquoi.*

The experiments on which that opinion was grounded, are described in my paper in *Phil. Trans.*, 1840, Art. 79, 129; and 1842, Art. 214, 215. In the first of these, the iodized paper was exposed *dry* to the action of the spectrum. In the others, the reversal of the action from the indigo upwards by excess of iodine was the subject under consideration, where the peculiar positive action comes on at that point with a suddenness and energy naturally leading to a persuasion that the less refrangible rays have, generally, a far inferior action on the iodic compounds to those of the more refrangible.

In studying the habits of the arseniates and arsenites of silver under the action of the spectrum, and of mixed light, with a view to satisfy myself as to the reality of the presence in certain arsenical solutions of a highly photographic metal to which I had applied the provisional name of junonium, I was led to remark that (operating by washes of these salts, and of nitrate of silver on paper, letting one dry before applying the other) *it made all the difference in the world which solution was laid on over the other.* The nitrate being laid on first, then dried, and the arsenical solutions afterwards washed over it, the action was extremely feeble and slow; quite otherwise when the order was reversed, and especially when the nitrate was applied to the paper actually under exposure to the light. In that case it was rapid and energetic (though very far inferior in both respects to the junoniferous solutions). This led me to a repetition of my former experiments with iodine and bromine, attending to the order of the washes, and observing always to apply the nitrate while under exposure. To my very great surprise, I found that under these circumstances, so far from the action of the spectrum on the iodine being either limited to the more refrangible rays, or very feeble in the yellow, orange, and red, it was carried down with nearly full intensity, not only to the very farthest extremity of the red (where the negative action on the bromine ceases), but very considerably beyond it. The following are the readings off of measures of the extent of the spectra impressed on the paper (after fixing and drying), on three several occasions (April 1, April 6, May 9, 1859), as read off on a scale of equal parts, the zero corresponding to the centre of the sun's image in the extreme fiducial red of a cobalt glass; —10·05 to the same centre in the fiducial yellow; 15·0 to the brightest green; 25·0 to the best blue; and 38·0 to the place of the second set of dark lines marked H in Fraunhofer's spectrum:—

	Iodurretted Paper.	Bromuretted Paper.
Least refracted extreme....	— 3·7	0·0
2nd experiment	— 4·0	— 0·5
3rd experiment	— 3·5	0·0
Mean..............	— 3·73	— 0·17
Most refracted extreme ...	+ 59·0	+ 64·5
	+ 58·5	+ 65·0
	+ 58·0	+ 65·0
	+ 58·50	+ 64·80

In all these readings due allowance is made for the sun's semi-diameter, so as to make them central. Thus we see that the action on the bromuretted paper is almost rigorously limited to the extreme visible red (where it is strong, and terminates very abruptly), while that on the iodized paper extends 3·73 parts of the scale, or about one-seventeenth of the whole length of the photographic spectrum, below it, or into the invisible heat rays. Its termination is less abrupt than in the other case, but the action is strong and decided to within a very few tenths of a part of the extremity. There is an evident though not a very strongly marked maximum of darkening at 34·5, or somewhat short of the best indigo. The bromuretted spectrum offers no such maximum, but is continued 6·3 parts beyond the cessation of the ioduretted into the invisible actinic rays. The action on nitrate of silver, *per se*, terminates at + 11·0.

These facts, I think, will rescue the iodide of silver, when properly used, from the imputation of insensibility to

the more luminous rays. It is for photographists to make the application in the manipulations of their art. In point of rapidity of action, there is no comparison between the dry and wet material.

Collingwood, July 16, 1859.

P.S. (July 17).—Under the action of such a sunshine as I never remember to have witnessed in England, and which has continued cloudless and perfect since sunrise, it occurred to me that before dispatching the above, I might procure some perfect and striking specimens of impressed spectra to send you in illustration of the facts insisted on in the above. To my great astonishment, I have *not been able to procure an iodized spectrum having the characters described;* but instead, nothing but spectra of the sort indicated in the paper first cited, viz., degrading in intensity from the blue to the red end, and almost evanescent in the least refrangible rays. What is still more surprising, the *iodine* impressions of to-day have been singularly feeble in intensity. This recalls a complaint I have somewhere read of the want of success in photographic operations under tropical sunshine.

I cannot, however, reject the evidence of the experiments I have related, whose results I have before my eyes (and which I send for your inspection, particularly requesting their return, as they are cut out of a register I keep of such spectra). To say nothing of the exact agreement of their measurements, there is one feature which admits of no explanations, on the supposition of mistake or accidental impurity. The iodine spectra extend farther into the *less* refrangible region than the bromine. *Now, hitherto no substance known has given any such result*, and the bromine spectra obtained to-day fall *somewhat* short of it. Junonium (if it be really a distinct body) *equals* bromine in this respect (as you will see by comparing the specimens sent); but this, so far as I am aware, is the only instance of so extensive an action.

Turning over my collection, I find three more iodine spectra, obtained on the 19th of March, all which agree in the prolongation of a powerful action far beyond the red viz., to — 3·0. On that day no corresponding spectrum with bromine was obtained.

The materials I have used to-day were identically the same as in the former experiments; but, anxious to account for the discordance of results, I have also used fresh iodine and nitrate, and varied the papers, but unavailingly. At present I will hazard no comment on this apparent contradiction.

METHODS OF INTENSIFYING NEGATIVES.

BY T. F. HARDWICH, ESQ.

In number 43 of the "Photographic News," the difficulty of obtaining *palladium* is spoken of as an objection to the use of that substance in photography, as lately proposed by Professor Draper, of New York. It appears that the price at the present time is nearly double that of gold, and the supply of the metal limited. I think, therefore, that I might save some of your readers the expense of purchasing the chloride of palladium, if I give them beforehand an idea of the amount of extra intensity which they will gain by its employment.

A ready mode of intensifying a weak negative is often required in copying manuscripts or printed matter of the same size as the original. It matters not whether a simply iodised collodion, or a bromo-iodised be employed for this purpose; in either case the first deposit of silver will often be of a metallic aspect, and in consequence the ordinary mixture of pyrogallic acid and nitrate of silver will fail in getting up the intensity. A solution of chloride of gold applied to this image, darkens it superficially to a considerable extent, and changes the colour by transmitted light to a deep violet blue. The chloride of palladium produces a shade of colour more nearly approaching to black, but in my hands neither gold nor palladium has proved to be sufficient to produce absolute opacity. Either of the following methods will, however, secure the desired result.

First. Dissolve thirty grains of bichloride of mercury in an ounce of warm water, and when the solution has become cold, apply it to the plate previously fixed and washed, until the silver is *entirely* converted into a white powder; this will take some time; now wash with water, and pour over the whitened image a very weak solution of hyposulphite of soda, containing, perhaps, six or eight grains to the ounce of water. The white powder is gradually blackened, and when the action has penetrated to the back it is complete.

You will easily explain to your readers, Mr. Editor, the *rationale* of this process, which no doubt is quite familiar to you. I merely mention it as one which will produce an impenetrable brown deposit, even under unfavourable conditions. It is possible, however, that some may not succeed, and if so I would direct their attention to the following fact, viz., *that it is quite necessary to start with a given quantity of real silver in the image*, otherwise the corrosive sublimate will not produce the requisite opacity. Supposing, for instance, you have an old manuscript to be copied without reduction, and you are working with a bromo-iodised collodion. On applying the sulphate of iron, an extremely delicate image comes out, but the letters are sharp and well defined. Now, wash off the sulphate and put on the pyrogallic acid and nitrate of silver; it appears to produce very little effect, but in reality an additional deposit of silver falls. Do this a second time, and, provided you can keep the letters clean, even a third. Lastly, fix with cyanide and examine by transmitted light. What, then, do you see? A translucent and grey image! Nevertheless the quantity of real silver in this image is considerable, and the intensity is wanting simply because the molecular state of the particles is unfavourable for obstructing light. Under the decomposing action of the bichloride, followed by hyposulphite, it will reach absolute opacity, whereas if the employment of the pyrogallic acid after the sulphate of iron had been omitted, the result might have been a failure from lack of silver to work upon. We learn, therefore, that it is difficult to judge of the quantity of metal in an image by simply holding it against the light.

Another process, which always appears to me ingenious and beautiful, is that of Barreswill and Davanne, originally published in the *Chimie Photographique*, but which I have not seen as yet in your journal. It does not appear to matter in this case whether the image is weak or strong. A solution of iodine is applied to the surface after fixing, and the plate is then washed and exposed to the light. On taking it back again into the dark room and treating with mixed pyrogallic acid and nitrate of silver, any amount of intensity can be obtained. Those who are fond of witnessing a pretty experiment may proceed shortly as follows:—Take any weak instantaneous positive, and in open daylight pour over it a solution of five grains each of iodine and iodide of potassium, in five ounces of water, until it becomes quite yellow from conversion into iodide of silver. Now wash and apply a few drachms of a ten or twenty grain silver solution and wash again. The blackening will then be very rapid under the influence of pyrogallic acid and nitrate of silver. This mode of proceeding may not, perhaps, be as certain as that originally devised, but it is quickly carried out, and will serve to show how much the process can accomplish.

I may observe, in conclusion, that I have very little faith in these modes of intensifying when the negative has a full gradation of tones, but for black and white objects

they are very useful. These remarks do not, of course, refer to Dr. Draper's method, which is serviceable when we wish to give, as it were, simply a finishing touch.

King's College, July 13th, 1859.

THE INFLUENCE OF LIGHT ON THE POLARISED ELECTRODE.

BY W. R. GROVE, ESQ., Q.C., V.P.R.S., &C.*

(*Abstract.*)

SOON after the experiments of Daguerre were published, it occurred to me that the galvanometer might be used as a test for the chemical effects of light; and I succeeded in obtaining a deflection of the needle, by allowing a beam of light suddenly to impinge on a daguerreotype plate in a trough of water—the plate being connected with one extremity of a galvanometer, and a gridiron of silver-wire placed in front of the plate with the other. This experiment I showed at a lecture at the London Institution, in 1843; and it was subsequently used as an illustration of the convertibility of force, in my essay on the "Correlation of Physical Forces."

I tried some further experiments at the time without obtaining results of any importance; but, as galvanometers at this period had not reached the degree of delicacy they have since attained in the hands of M. Ruhmkorff, I determined, this summer, to resume the inquiry; and the results I have obtained I now proceed to describe. The galvanometer used in the following experiments is by Ruhmkorff, formed of 544 feet of fine copper wire, and though not so delicate as the very long wire instruments used by M. Du Bois Reymond and others, it has proved sufficiently delicate for most of the effects I aimed at.

The idea with which I started was to arrange two plates of platinum in an electrolyte in such a manner that a bright beam of light should impinge on one while the other was in darkness, and yet to allow free electrolytic communication. After making a somewhat complex apparatus, which did not answer the purpose, the following simple means of effecting my object was adopted:—In a cell similar to those used for the nitric acid battery, the outer cell being of thin glass and the inner one of porous ware, two platinum plates were placed, each of six inches by two—four inches by two, or the immersed portions of the plates, being platinised or coated with a deposit of black platinum. Both the outer and inner cells were filled with distilled water, slightly acidulated with sulphuric acid; and some tow, steeped in the same solution, was stuffed into the upper part of the porous cell around the platinum, so that this latter plate was perfectly excluded from light. The extremities of the two plates were metallically connected. A brass cylinder, covered at the top, was placed over the whole, its lower circumference resting on a circular pad of paper, so as to exclude light.

The apparatus, thus disposed, was set aside for ten days, so as to allow the local currents to subside. At the expiration of this period the apparatus was taken into bright sunlight, the position of the plates so arranged that the one in the outer or glass cell should be opposite the sun, the terminals connected with the galvanometer, and the temporary deflection occasioned by polarisation allowed to subside, or rather to reach a fixed point, for there was always a slight deflection.

The brass cylinder, which excluded light from the apparatus, was now removed; and the galvanometer needle instantly deviated to 10°, the platinum exposed to sunlight being positive to that in the dark, or as zinc to copper. The platinum plates were now reversed, that which had been in the outer cell placed in the porous cell, and *vice versâ*, and the apparatus again set aside for ten days; at the end of this period it was again taken out, the experiment repeated, and the same result obtained; *i.e.*, on removing the brass cylinder there was a deflection of 12°, the platinum exposed to light being positive to the sheltered one.

The identity of electrical effect, taking place with the reversed plate, seemed so strongly in favour of the impact of the solar rays having an initiatory effect in producing a voltaic current, that the only remaining point seemed to be to ascertain whether it was due to light or heat, to the chemical or calorific rays of the sun; yet the conclusion I then came to was erroneous, as will presently be seen.

In order to ascertain how far the effect was due to heat, I arranged, in a room lighted by a small candle, the same apparatus over a fire of asbestos, heated by coal gas, so that both radiant heat and an ascending current of hot air impinged on the side of the glass in which was the exposed platinum, while the opposite side was entirely sheltered from the heat by a metallic shelf on which the cell rested; this experiment was continued until one side of the cell was uncomfortably hot to the hand, while the other side was quite cool; but not the slightest deviation of the galvanometer took place.

I now repeated the former experiment with sunlight, changing the liquid each time.

In three successive experiments the deflections on the impact of light were in the same direction, the exposed platinum being positive; but, in a fourth, the deflection was in the reverse direction, the exposed platinum being negative; in several subsequent experiments there was always a notable deflection which ensued on the impact of light, but it was sometimes in one direction and sometimes in the other. I ultimately discovered that, in the deflection produced by light, the needle of the galvanometer deviated in the same direction which it took upon the first contact of the wires connected with the platinum plates. The effect of light was, therefore, to increase the deflection occasioned by the polarisation of the platinum plates; and this, my subsequent experiments have, I think, fully established.

Although the experiment on the impact of heat seemed to show that the heating effect of the solar rays was not the cause of the phenomena, yet it might well be that the solar rays absorbed by the platinum black would produce a greater heating effect at the actual point of contact of the platinum and liquid than any non-luminous heat would produce; and I was, therefore, anxious to ascertain whether the different coloured rays of light showed any difference in their effects. To this end I procured three plates of coloured glass, one blue, the second yellow, and the third red; a strip of thick brown paper was pasted to the opposite sides of each of these plates of glass, so as to form a nearly cylindrical chamber cut by the plane of the glass. A cover was placed over each of them; and the chambers so formed could be placed over the cell containing the platinum plates, the coloured glass plates intervening between the sun and the platinum in the outer cell. A great number of experiments were made with these apparatus; and in all the deviations of the galvanometer were notably greater with the blue glass than with the yellow or red, and, of the latter two, the yellow gave slightly greater deflections than the red glass.

This result is, I think, conclusive in favour of the effect being due to the chemical, not to the calorific rays of the sun, the more so when we consider that the yellow glass allowed a far larger quantity of light to pass than the blue glass. I may also add that I have obtained a slight galvanometric deflection when diffused daylight was allowed to impinge on the platinum plate, and where there was no perceptible difference of temperature between the illuminated and the non-illuminated plates.

The superiority of the yellow over the red was not so strongly marked; and, considering that the yellow glass allowed much more light to pass than the red, I am not disposed to think that there was any actual superiority in the former; the effects observed with these two colours are, however, corroborative of the effects not being due to the red or heating rays of the sun.

. . . .

* Communicated by the author to the *Philosophical Magazine*, having been read at the last Meeting of the British Association.

In a small number of experiments the following effect took place:—

After a certain time of connection with the galvanometer, the cover being over the apparatus, the signs of polarisation changed, *i.e.*, supposing the needle of the galvanometer to deviate to the left, and indicate that the exposed platinum was positive, the needle would gradually return, pass the zero point, and be deviated to the right; when this was not the case on removing the cover, the effect occasioned by the impact of light was a return of the needle towards the zero point, indicating an influence in the direction of the original polarisation. On setting aside the apparatus for twenty-four hours, with the plates in metallic connection, and then repeating the experiment, the deviation of the galvanometer was in the direction of the final polarisation. This apparent anomaly may have arisen from a conflict of two classes of currents—the one arising from imperfect mixing or want of homogeneity in the liquid, and the other from the state of surface of the platinum; the latter would most probably be the current affected by light.

As the general effect of light was to increase the deflections occasioned by polarisation, whatever direction these assumed, it seemed probable that the exclusion of one of the plates from the light, which I had commenced with in the hope of obtaining a current initiated by light, was unnecessary, and that the observed effects would be rather increased by exposing both plates to light. I therefore arranged two platinised plates in a cell without a porous diaphragm, inclined to each other like the letter V, but without contact, and allowed the light to impinge on the interior surfaces, or those exposed to each other; but, to my surprise, the effect was very trifling, the needle deviating only one or two degrees, and that in a sluggish and irregular manner.

When, however, the two plates were arranged parallel, the one shading the other from the light, as good deflections were produced as with the porous cell—the more so if the black or shaded plate were of polished, and the front plate of platinised platinum.

Why light should produce a greater augmentation of the current, when impinging upon one than on the two plates, I cannot well understand, and therefore will not attempt any hypothetic explanation, but leave it for further experiment.

In all the experiments I have made on the subject of this paper, the most marked effect upon the galvanometer is produced when the polarisation causes a small permanent deflection of from 5° to 10°; when the polarisation of the plates is extremely slight, the effect of light is very feeble; and when the polarisation is considerable, so as to deflect the galvanometer to 20° or 30°, the increased force required to produce a small increase of deflection is too great to afford notable results.

I have used the term polarisation, having no better word to indicate the feeble currents which are always observed when two platinum plates, immersed in a liquid, are connected with a delicate galvanometer. The electrical currents which would ensue if the plates were polarised by connecting them with a voltaic battery, and then detaching them, would be far too powerful for the delicate indications which I have been examining. There can be no doubt, at least to those who adopt the chemical theory of the voltaic pile, that both these classes of polarisation are due, when one homogeneous liquid is employed, to slight deposits on the plates, either of films of gas, or of some substance which acts chemically on the liquids, and the effect of light would seem simply so, or an augmentation of the chemical action taking place at the surface of the electrodes, which is the *locus* where the chemical changes, producing or produced by voltaic currents, are always observable.

With more sensitive galvanometers, and with a greater variety of solutions, this class of experiments may, I venture to hope, be found important in further investigating the effects of light on chemical actions; and the pure coloured rays of the spectrum may be employed.

There can, I think, from analogy, be little doubt that light would influence those actions of surface which are comprehended among the various effects to which the term catalysis is applied. In an experiment I made in the month of September, 1851, two similar glass tubes, containing each 15 grains of water, were placed, the one under an opaque porcelain, and the other under a glass vessel of the same size, with capsules of sulphuric acid by their sides; I found that evaporation took place much more rapidly in the one exposed to light, though it was in a room with a northern aspect, on which the sun never shone. In twelve days the water under the glass vessel had lost 6·3 grains, that under the porcelain 5·4, showing a difference of nearly a sixth part in the evaporation in favour of the tube exposed to light. I mention this experiment here as showing a probability that the liberation of vapour or gas may be accelerated by light, as M. Donny's remarkable experiment seems to show that evaporation is a surface action, and the effect of light on polarised plates may be somewhat of the same nature.

AUSTRALIAN NATURE AND THE ART OF THE PHOTOGRAPHER.

Few persons are now of sufficient age, to recollect the sensation which the natural productions of New Holland produced in Europe, when first brought hither. A quadruped furnished with the bill of a duck,* a hedgehog of a similar extraordinary appearance,† a tree which bore wooden pears, and similar anomalous productions, astonished the general public, while even the learned shared that surprise. It was the celebrated Professor Blumenbach, of Göttingen, who thought that the continent of New Holland was a piece of the moon or other star, which had fallen with its strange productions on the surface of our globe. Successively, when other parts of the world became more thoroughly examined, there were found intermediate and transition types, and placed New Holland and its nature into due equilibrium with the other creation.

Still, Australian nature is one replete with wonder and beauty, and the civilised world will become astonished and pleased, whenever heliography will have brought to our notice the various products of that strange land. To begin with the highest types of nature: the aspect of the starry heavens is so different from that of our northern hemisphere, and the *southern cross* and the Magellanic clouds are sights of surprising interest. As photography has already succeeded in fixing and retaining the heaving waves of the ocean, the world of *clouds* in Australia (a knowledge first hinted at by Howard) will be the more interesting, as it is in that part of the world alone, that those *nuggets* of ice, some 6 and 7 inches long, descend from heaven, and indicate a strange and different composition and arrangement of the atmospheric elements. All these subjects our noble art ought to seize, as they will not only interest Europe, but be a source of profit to the artist thus engaged. In all these endeavours we recommend boldness and a *large* scale of plates, because it is only such which will find their way into works and periodicals of a high order.

It was when examining, several years ago, the fine paintings of American nature, by Mr. Catlin, that the idea struck us that there may be, in those distant wilds, geological phenomena, if not geological *formations*, not observed hitherto in other parts and unknown to science. Now, amongst the numerous aids which science in general will receive from photography, that afforded to geology will be one of the most important; because no amount of industry or talent will ever enable the draughtsman to delineate the face of these gaps and crevices and *éboulements*, which are the very anatomical preparations of that huge organism called the globe. Not to mention some most curious forms and appearances in the interior of the Australian Alps, seen but by few Europeans; yet, the Shoal-haven Gully, south of Sydney, said to be 2,000 feet deep (?), is an object of the

* Ornithorynchus paradoxus. † Echidna histrix

greatest curiosity; more worthy of attention than those numberless sights of the Swiss Alps, reproduced now *usque ad nauseam*. And we have yet to observe, that the more varied be the usages to which photography may be applied, this will not only benefit those departments of art and science, but impart to heliography new methods and new proceedings. And thus we are convinced that the seizing of large extents of the cloudy atmosphere, as well as that of large geological *tableaux*, will require and bring forth new proceedings of tinting and colouring.—Several parts of Australia are surrounded by iron-bound shores and rocks, some of which are even of historical interest; for instance, the rocks called Tasman and his Wife, in Tasman's Peninsula (Van Diemen's Land), where the Dutch navigator first landed, in 1646, a discovery considered even then so important, that the paved floor of the court house in Dortrecht was made to represent the track of this enterprising man.

If, as we said before, everything in New Holland exhibits such a strange and original character, we may, commencing with the general features of the country, first mention its flower-meadows, which also are distinct from anything of the kind in Europe, and can only be compared somewhat with the large *Ericeta* (heaths) of the Cape of Good Hope. In Australia, there are miles of partly sandy and partly swampy ground, covered by myriads of those little shrubs and plants, which, in England, constitute the pride of our conservatories. Such are Epacris, Delvynia, Gompholobium, and the like, which being all very ornamental and fine flowering, impart to these localities a very great charm. The hand and eye of the draughtsman would weary to trace these numberless forms, and it is only heliography which can lay down infinite objects in an infinitely short space of time. To make such a view still more interesting to the descriptive geographer, we have to state, that those Australian flower-meadows must not be imagined as being destitute of larger shrubs and trees. On the contrary, here and there one of the fantastic palm-like Xantorrheas, or Casuarinas, somewhat resembling a weeping willow, or even a large gum tree (Eucalyptus), diversify the aspect, and add to the originality of the sight. We may here state our general belief, that as soon as *geography* will really deserve the name of an earth-depictor, such scenes and sights will largely appear in its pages, to displace those descriptions of dynastic palaces and other transitory political phenomena, now occupying so much of its space.

Our allusions to Australian scenery would not be considered complete, if we were not to mention those *natural parks*, if we may so call them, which struck even the first tourists to the antipodes. Their appearance denotes good pasture land, and the soil is a compound of sand and humus. As in our parks, stately trees are scattered over the ground, mostly gum (Eucalyptus), a tree which often does not branch off but at a height of 50 to 60 feet, and the bark of which is often of a white, glossy colour. With the exception of a very little under-wood, the soil is covered with tender grass, and these are the places where the millions of merino sheep, introduced so fortuitously into these colonies, graze the whole year round—wandering goldmines, as it were, which now yield a million sterling every year. The sight of these park-like localities, illumined by either the rising or setting sun, under a sky ever clear and brilliant, will yield unsurpassed scenery to the camera of an able artist. If we proceed north (towards the line), Australian nature assumes a more tropical aspect, and near Moreton Bay forests are to be met with so dense, that they are spread over with darkness, even in the day time.

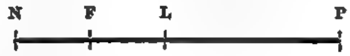
The members of the *Alpine Club*, and the friends of similar enterprise, will learn with pleasure, that Australia also presents opportunities for the healthful and invigorating alp-climbing—although at a rather long distance. Under that latitude, however, these mountains do not attain the limit of perennial ice (*glaciers*), and only their summit being at particular seasons covered with a transient layer of snow. But there are gullies and secluded valleys there, where the snow has destroyed long tracts of the semi-tropical vegetation. Here the professional photographer or amateur may find a vast field of interesting and lucrative employment; as, we repeat, the engraver, woodcutter, and publishers, all over Europe, are most anxious for novel and well-executed heliographic plates.

(To be concluded in our next.)

DIMENSIONS FOR A COPYING CAMERA.

BY JOHN SANG.

The following table, which shows the dimensions of copying cameras, will at once solve the question of your correspondent, "Capt. S. S. B.," and probably also may be useful to other readers who mean to construct such instruments. It gives the dimensions of the box for making copies equal in size to the negatives, and from that upwards to magnifying them ten times. It can be extended to any other magnifying power, by observing that $(NL)^2 = NF \times NP$. (see figure). N being the negative, P the positive, or focussing screen, L the lens, and F the focus for parallel rays.



In the table the focal length of the lens (that is FL), is conceived to be 1.

$\frac{LP}{LN}$	LP	LN	NP
Enlargement, or number of times the length of the positive contains that of the negative.	Distance between the positive and the lens.	Distance between the negative and the lens.	Length of the box measured between the negative and the positive.
1	2	2·0	4·00
2	3	1·5	4·50
3	4	[illegible]	[illegible]
4	5	1·25	6·25
[illegible]	6	1·2	7·20
6	7	1·166	8·17
7	[illegible]	1·142	9·14
7·873	8·873	1·127	10·00
8	9	1·125	10·12
9	10	1·111	10·11
10	11	1·1	12·10

As the numbers are all in terms of the focal length, in order to apply them, it is only necessary to multiply by the focal length of the lens under consideration. For example, "Capt. S. S. B." wants to find the dimensions of a camera for enlarging negatives 2 inches square to 10×8 inches; as his negative is square, its side must be enlarged until it covers the greatest dimension of the oblong picture he wishes, that is to say, 2 inches must be magnified into 10, or 5 times. The focal length of his lens is $2\frac{1}{2}$ inches. The numbers in the line of the table opposite an enlargement of 5 times, must be multiplied by $2\frac{1}{2}$ to give the dimensions suitable for that lens.

Thus the length of the box (or rather the distance betwixt the negative and the focussing screen) is $7{\cdot}2 \times 2\frac{1}{2} = 18$ inches. The distance of the lens from the negative is $1{\cdot}2 \times 2\frac{1}{2} = 3$ inches. The distance of the lens from the positive is $6 \times 2\frac{1}{2} = 15$ inches. Also, in order that he may have it in his power to enlarge the pictures any degree between equality and 5 times, his box must be so arranged, that by means of a sliding motion or otherwise, the distance between the negative and positive may be reduced to $4 \times 2\frac{1}{2} = 10$ inches, while the lens must be capable of being moved to within a distance from the negative of $2 \times 2\frac{1}{2} = 5$ inches.

Of course, it is imperative that the true principal focal length of the lens be taken, that is to say, the distance between the optical centre of the lens and the image of the sun. It will not do to form an image of the sun on a piece of paper, with a combination of lenses for photographing, to

measure the distance of the image from the back lens, and call that the principal focal length of the combination. The distance between the paper and the optical centre must be measured, and as it is difficult to discover that point, I have also inserted a line in the table (enlargement 7·873) by which the focal length of a photographic combination may be found very readily and without calculation.

On looking along to the last column at 7·873, it will be observed that if a lens enlarges at this rate, the distance between the object and its image is 10 times its focal length. It is the same if it diminishes an object at an equal rate. Consequently, the focal length may be found thus:—

Mark off exactly 2 inches on the ground glass of the camera by a pencil line; cut a strip of white paper exactly to the length of 15¾ inches; cause the picture of the strip of paper to fall on the focussing glass. If the picture is longer than the space marked off, move the paper away from the camera; if smaller, bring it nearer until the length of a sharp picture of the piece of paper is exactly 2 inches. Measure the distance between the paper and the ground glass of the camera; the tenth part of that distance is the focal length of the combination. It would be the same thing if the piece of paper had been made 7·873 inches, and the mark on the focussing glass 1 inch, or any other suitable lengths in the proportion of 7·873 to 1.

Kirkaldy, 11*th July*, 1859.

PORTABLE DARK ROOM AND CAMERA FOR THE PAPER PROCESSES.

BY M. F. TILLARD.*

THE camera that I have the honour to submit to the Society, is one that I have had in use for some time. My object has been as much as possible to reduce in amount and to simplify the photographer's hitherto very complicated baggage. I believe I have succeeded in obtaining a result which appeared, at first sight, almost too simple, too primitively common, for me to presume to consider a description of it worthy the attention of this learned Society; but I yielded to the solicitations of several of your members, who, having recognised the advantage of my dark room, have adopted its use, and have urged me to make the following communication. I should first observe that my system does away with all dark slides, the smallest number of which is very cumbersome to the operator when requiring to work in the country or on the march, so to speak. Instead of my apparatus, as is ordinarily the case, being immensely heavy, I have simply the weight of twelve sheets of very light cardboard; that is, if I wish to obtain twelve photographs.

Although the modification that I have introduced into the system of the dark room relates only to the arrangement of the dark slides, I should observe that I have adopted for the body of the room itself a light white wood, as lime, instead of walnut, which warps, becomes twisted, and is very heavy. My dark room, then, is formed of very thin planks of lime-wood carefully put together, and uniting to this the insignificant weight of my dozen paper holders, I can, when travelling, dispense with the customary porter, who is often very difficult to procure, and always a most expensive appendant. I therefore recommend to travelling operators the portable camera made of light wood.

In the ordinary dark slides a sheet of negative paper is kept in place by the pressure of one or two glasses. This being necessary, and the front glass being required to serve for a rest, I use for this purpose the ground glass itself.

I fix, then, this glass, with the *ground side outward*, in a frame, letting the edges project beyond, about the thickness of a stout Bristol board, and this remains fixed in the camera instead of being movable, as in the old system. The object to be photographed having been focussed, I do not remove the glass, but only apply against it one of the frames, which I will endeavour to describe, and in which will be recognised, doubtless, the frame invented by M. Clement, and which bears his name. I should say in passing, without wishing at all to deprive M. Clement of the merit of his idea, that more than five years before he published his system of frames, I had exhibited some precisely similar to several members of this Society. I mention this fact from no desire of disputing with M. Clement the question of priority of invention, as these frames are but an accessory in my system.

These slides are made of two sheets of strong cardboard laid one upon another—the one plain, the other cut so as to form upon the first a frame, of which the borders are only about three centimetres (three quarters of an inch) wide, three sides being glued together, thus somewhat resembling the cardboard portfolio of a travelling landscape painter. On the side where the two cards remain, not adhering to one another, I slip a sheet of sensitive paper, and on this in the same groove another sheet of cardboard, several centimetres longer than the paper, thus filling the place of the wooden front of the ordinary frame. The frames being furnished with negative paper, I push one of them towards the ground glass, and there applying it on the side of the card forming the frame, and pressing it with the hand, I uncover the negative sheet by removing the sheet of cardboard which had been first placed over it in the groove of the frame. Then, still holding the frame with the hand, I lay behind it a little board, so as to produce a pressure upon the frame in the same way as it is done in positive pressure frames.

This pressure is caused by using two movable strips of wood turning round a pivot. Their extremities are placed in lateral nicks in the hind parts of the camera. These nicks, cut obliquely, allow the use of more or less pressure in causing the strips of wood to be pushed in more or less deeply. I have said that the ground glass projects over the frame where it is placed. This projection coming against the open part of the cardboard frame by means of the pressure used, occasions an immediate contact between the sensitive sheet and the glass on which the image is portrayed. The exposure terminated, the small board is removed, in order to replace the front cardboard slide, and the negative paper is withdrawn from the luminous rays, and another slide may be substituted. It has probably been remarked that I operate by exposing the sensitive sheet behind the ground glass. I affirm that this intervening does in no way interfere with the faithfulness of the image, and I even prefer ground glass to clear glass, which may be untrue and cause a deviation of the photogenic rays. In case it might be desired to use clear glass, nothing would be more simple than to substitute a frame containing one for that containing the ground glass, after having obtained the focus. This would only be a trifling addition to the weight of the photographic baggage, without rendering it more cumbersome.

* Description of an apparatus exhibited by the author at the French Photographic Society.

EMPLOYMENT OF SALTS OF CADMIUM IN THE COLLODIO-ALBUMEN PROCESS.

BY M. DAVANNE.

THE object of these remarks is to rectify a formula which has been given for the preparation of albumenised dry collodion (Taupenot's process), and which prescribes the use of salts of cadmium dissolved in white of egg. An experiment made with this object convinces me, that the author of the formula had published it without having previously proved its correctness. In fact, iodide and bromide of cadmium immediately curdled the albumen so decidedly, that I imagined I must, by mistake, have employed bichlorure of mercury instead of bromide of cadmium, the two substances being somewhat similar. But a further trial convinced me, that the iodide and bromide of cadmium produced the same effect upon the albumen as a large number of metallic salts, such as nitrate of silver, bichlorure of mercury, sulphate of copper, &c. That this effect is very powerful is proved by the fact, that it is visible in liquids very much diluted; as, for instance, a single gramme of white of egg

dissolved in eight hundred grammes of water becomes troubled when a few drops of dissolved iodide of cadmium are poured into it. The other salts of cadmium have the same property, though in a less degree than the iodide. Perhaps I ought to attribute to this action of the salts of cadmium upon the albumen a number of long spots, appearing to proceed from a partial coagulation of the albumen, and which became especially visible whenever I used old collodions with the iodide of cadmium, in order to obtain upon the glasses the first layer of iodide of silver, and which I afterwards covered with albumen. Perhaps a small quantity of salts of cadmium remained in the layer of collodion. I have since been more constantly successful in only using collodions prepared with the iodide of ammonium. I therefore think, that in preparing plates by the Taupenot process, it is better not to use collodions prepared with the iodide of cadmium; and I must, at the same time, warn photographers, that they will completely lose their albumen whenever the iodide or bromide of cadmium is introduced into it.

Dictionary of Photography.

EXPERIMENT.—A trial, an act, or operation to discover some unknown fact, principle, or effect, or to establish it more conclusively when discovered.

EXPOSURE.—The time during which a sensitive surface should be exposed to the action of the light, is one of those points in photographic manipulation respecting which precept can teach the operator very little. Experience is almost the only guide to be followed, as, owing to the varying intensity of the light, the requisite time will be constantly changing. In determining the time, some account must be taken of the colour of the object to be copied, as all colours are not equally active. Thus, yellow, green, and red, have very little action. The photographic intensity of light decreases very sensibly in proportion as the sun approaches the horizon; and the state of the atmosphere must also be taken into account, as the time of exposure is much retarded if it is the least hazy or of a yellowish appearance. In the event of a first attempt failing, the operator should immediately try a second time, and by a little thought on the appearances presented by the unsuccessful picture, he will be most likely to time the exposure of the second picture correctly. The following are some indications whereby the operator may know whether he has exposed the plate too long or too short a time:—An under-exposed picture is slow in appearing, and by continuing the development for some time, the high lights become very intense without the shadows making their appearance, and the resulting picture is of that class usually denominated "soot and whitewash." An over-exposed picture, on the contrary, makes its appearance very rapidly, the shadows developing almost as soon as the high lights. The plate soon blackens all over the surface, and the result on fixing is a misty, indistinct, and faint picture, of a red or brown colour.

FERROCYANIDE OF POTASSIUM, or *Yellow Prussiate of Potassa*, is a beautiful salt, forming large transparent yellow crystals. They dissolve with ease in 4 parts of cold and in 2 of boiling water, and are insoluble in alcohol. When exposed to a gentle heat, the salt loses water and becomes white and anhydrous. Ferrocyanide of potassium is of great value as a chemical reagent, as it gives rise to precipitates, which have frequently a very characteristic colour, when mixed with neutral solutions of the heavy metals. It has been employed by Sir John Herschel, Mr. Hunt, and others in various photographic processes, both as an agent sensitive to light in itself, or in combination with iodide of silver, and as a developing agent when salts of iron were used as a sensitive material, as in the cyanotype process.

FILM.—The thin coating of collodion, albumen, or other substance with which paper or glass is coated for photographic purposes. The sensitive coating of iodide of silver itself is also frequently called the film.

FILTER, a strainer; a piece of paper, cloth, or other substance through which liquids are passed to remove impurities or solid matter suspended in them.—A filter for photographic purposes is best made by employing a glass funnel and inserting a piece of filtering paper cut and folded in the proper manner. The filtering paper used for this purpose should be the best thin white blotting paper. In making a paper filter, take a square piece of the paper of a size proportionate to that of the funnel, and first double it from corner to corner in the form of a triangle; double this again in the middle so as to form a smaller triangle, and round off the angular portion of the margin with a pair of scissors; this, when two adjacent sides are separated, forms a hollow cone, the apex of which is to be placed downwards in the funnel. Another way of forming a paper filter is to double the paper once and then fold it in the same way as a fan, observing so to open it and lay it on the funnel, that the folded edges of the paper touch the inside of the funnel and form a series of grooves, so as to allow of the free percolation of the liquid.

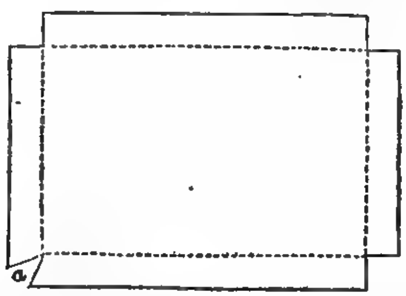
(To be continued.)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

ONE of the most desirable characteristics which can pertain to any mode of manipulating is, simplicity; we shall, therefore, now describe a method of producing a gutta percha dish far exceeding in ease and simplicity either of those we have already explained. At first sight it would appear that dishes made as we are about to describe would be wanting in strength and durability; we may remark, however, that we have had some in daily use for many years, which are now as good as when they were made. The plan has the special advantage of enabling the tourist to improvise a dish in five minutes in any place where he can procure a piece of sheet gutta percha.

Take a piece of gutta percha of the requisite thickness, say one-sixth of an inch, and cut it to the following shape, the size, of course, being governed by the required dimensions of the dish:—



The square pieces cut out at the corners must be the size of the intended depth of the dish, say from three quarters of an inch to an inch. The cut should not be quite straight through the sheet, but with a slight bevel inwards, so that when the sides are bent up, the meeting edges shall form a mitre. The piece cut out at the corner marked *a*, is not square like the others but an irregular lozenge, the object being to form a lip or spout to the dish, to pour from. Now place the gutta percha on a table with the bevelled edges downward, and run the point of a sharp penknife along a straight edge in the direction of the dotted lines in the wood-cut. The incision need not be deep, not more than one-eighth of the thickness of the sheet; it will be quite sufficient to allow the edges to be turned up to form the sides of the dish without any difficulty. This done, pass the two bevelled edges which form a corner through the flame of gas or a spirit lamp, applying just sufficient heat to make the surfaces sticky throughout; then bring then firmly together, plying them gently into shape with the fingers, and holding them in position for a few minutes until thoroughly set. If

properly done, the joint will be perfectly strong and firm. Each of the corners in succession will be so treated, and the result will be a dish neat, trim, and square, produced in a few minutes. As we have before said, we do not find the strength in any practical degree impaired by the incision made to facilitate turning up the edges. If additional strength be required, however, it can easily be obtained. Either the corners or edges can be strengthened, by cutting pieces of thin sheet to the proper size; these must be pared down at the edges so as to form a feather-edge; the edge to be strengthened and the surface of the piece to be applied must then be softened in the flame as before described and then pressed into contact with the fingers. It must be remembered that *both* surfaces to be joined must be heated, as one piece of gutta percha in a plastic state will not adhere to another which is quite cold and not plastic. If on trying the dish any leakage is observed at any of the corners, the place can easily be repaired by passing it carefully through the flame and pressing it together with the finger and thumb, or by heating a small piece and applying it to the hole, which must also be heated.

We may here take occasion to answer the queries of a correspondent in No. 40 of the present volume, relative to the construction of dishes of card-board and gutta percha. The plan he proposes of cementing the pieces of card-board by means of gutta percha, will, we fear, scarcely prove efficient. The best mode of proceeding will be to cut a piece of card-board of the requisite size and thickness to the shape of the foregoing wood-cut, with this slight difference, that the pieces out of each of the corners had better be square, as it will be undesirable to attempt to form any lip or spout. With a pen-knife, as before directed, make a *very slight* incision from corner to corner; then turn up the sides, and proceed to secure the corners, and strengthen the bottom edges, which are turned up as follows: take strips of tough, thin cartridge paper, and by means of good paste or glue, secure them to the corners and edges. If marine glue be used, it will make the joints waterproof; it will be found, however, a little more difficult to use. We purpose, in a future article, to describe the best modes of using it for a variety of purposes. The joints being secured, the dish can be strengthened and made neat by covering it inside and out with cartridge paper. It may then be made waterproof by means of a solution of gutta percha. The proportions of gutta percha and benzol to form the solution must be left somewhat to the discretion of the manipulator; we may remark, however, that gutta percha in the same proportion will make a much thicker solution than most of the gums or resins. If the gutta percha be tolerably pure, having very little impurity to precipitate, a drachm to an ounce of benzol will form a tolerably thick solution. To prepare it, the gutta percha should be cut up into very small pieces or thin shavings, and immersed in the benzol, the bottle containing which should be very lightly corked and placed in a vessel of hot water. Without the aid of heat, the process of dissolving will be very slow and incomplete; and if the bottle be tightly corked the expansion of the benzol will cause some danger of explosion. The solution will be more limpid and easy to use whilst it is warm. The best method of applying it to the card-board dish will be to pour it in and allow it to run over the entire surface, and then return the residue to the bottle. When this is dry, the process may, if necessary, be repeated. The dishes so formed will be light, and for some purposes useful; but they will not bear rough usage.

Perhaps the most efficient method of rendering such card-board dishes waterproof would be to cover them inside and out with the gutta percha satin tissue about the thickness of paper. To do this, two pieces should be cut of the same shape, but slightly larger than the card-board, so as to allow the joints to overlap. Instead of the flame of a lamp, a piece of thick wire heated would best answer the purpose of forming the joints.

(*To be continued.*)

THE distance of the moon from the earth is about 240,000 miles; and if a railway carriage were to travel at the rate of 1,000 miles a day, it would be eight months in reaching the moon. But that is nothing compared with the length of time it would occupy a locomotive to reach the sun from the earth; if travelling at the rate of 1,000 miles a day, it would require 260 years to reach it.—*Curiosities of Science.*

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 18*th July*, 1859.

A NEW volume of Arago's posthumous works has appeared since my last letter was posted to you. This new volume contains a letter from Arago to the Minister of the Interior on the discoveries of MM. Nièpce and Daguerre; it is dated 1839, and will doubtless be read with interest if it be true, as I am informed, that this letter is now published for the first time. It runs thus:—

"MONSIEUR LE MINISTRE,—After fifteen years of assiduous, delicate, and expensive researches, MM. Nièpce and Daguerre have at last been able to fix the images produced in the camera obscura—to employ the solar rays themselves for drawing—to give birth in four or five minutes to pictures, in which objects preserve mathematically their forms, even to the minutest details; in which linear perspective and variety of tones are produced with a degree of fineness hitherto unknown.

"I do not exaggerate when I affirm that the method which M. Daguerre has finally hit upon, gives most admirable results. Unhappily for the fortune of this talented artist, the method cannot become the object of a patent. As soon as it shall be known, every one will be able to apply it; the most clumsy operator will be able to take views as perfect as those of an experienced artist.

"The author of so fine, so unexpected, and so useful a discovery, has certainly done honour to his country, and his country alone can recompense him.

"I know personally that M. Daguerre has refused certain seducing offers made to him in the name of several powerful sovereigns. This circumstance cannot fail to augment the interest which every one takes in him. It will increase, in the Chambers, the number, already so great, of persons who only await an opportunity to show the sympathy they bear towards the unhappy inventor of the photogenic process and of the diorama.

"I take the liberty, M. le Ministre, of asking you if the report be true that you intend to solicit the Chambers for a national recompense in favour of M. Daguerre.

"I most ardently desire to receive an affirmative answer, in case of which I put myself entirely at your disposal, both for the preliminary stipulations and for the discussion that such a proposition might give rise to.

"In the supposition that, contrary to my expectations and my wishes, you should not think it proper that the Government take the initiative, you will not consider it wrong, I hope, if, acting according to a desire which has arisen from every seat in the Chamber of Deputies, I should endeavour myself, by a formal proposition, to interest that Chamber in the discovery of our ingenious fellow-countryman."

Thus we have an example of the manner in which the French protect one another. The volume from which we have just extracted the above letter forms the 12th volume of Arago's works, published so rapidly by MM. Gide and Barral; it is certainly one of the most interesting.

In one of my former letters I mentioned a new process of photographic engraving, which has since been more fully explained in the "PHOTOGRAPHIC NEWS." This process, which we owe to M. Berchtold, has, according to the journal *La Lumière* of the 2nd July, received a new application. By employing a negative as type, this artist has been able to work upon metallic plates deep enough to produce *rélievo* engraving similar to woodcuts, without sacrificing the harmonious tone of the whole. The metal preferred is zinc, and the printing of it is not more difficult than ordinary woodcut printing. M. Ponçon recommends chloride of lime, made into a paste with a little water, as a rapid and easy means of effacing from the fingers of photographers the dark stains of nitrate of silver.

On the nights of the 13th and 14th of March last, a certain frog deposited a considerable number of eggs or spawn, from which, in the course of a few days, a number of tadpoles were developed. Two of these were chosen by M. Vulpian, for an experiment. One of them, a stout tadpole, had his tail cut off on the 28th of March; the other had *his* tail cut off on the 29th. The tail of the first tadpole *lived* for nine days, and died on the 6th of April; the tail of the second lived one day longer, and died on the 8th of April.

M. Vulpian assures us, that last year the tails of tadpoles were endowed with a stronger vitality, for he observed some of them to live for eighteen days after they had been separated from what we may, perhaps, be allowed to call the body of the tadpole.

As this subject is not devoid of interest, and forms, in fact, part of an important physiological question, M. Vulpian has lately devoted a good deal of attention to it. First of all, it was necessary to ascertain the precise state of the tail the moment it is separated from the tadpole. As the latter were very young when M. Vulpian began his observations this year, everything in the tail was in a rudimentary state: the elements of the vertebral axis and the muscles were only sketched in, as it were; there was, at least, in the anterior part of the tail, a prolongation of the spinal marrow in an embryo state; no nerves or blood-vessels were to be seen, and probably the aortic trunk only was, as yet, formed. The epithelium and all the adjacent cells were full of vitellinous granulations; the epithelial cells contained, moreover, numerous granules of pigment, and were supplied with vibratile cilia.

In such a tail separated from the body of the animal, no movement could be produced by the application of slight external excitement.

During the first few days after its separation, the tail becomes flat and elongated, the wound made by the section heals up, and by the intense vegetative activity of the cells at this point, a new part is formed which augments each day in dimensions.

The epidermic ciliated cells multiply rapidly, and soon cover completely the new part just mentioned, which goes on growing; at the same time, the granules of vitellinous matter, and of pigment contained in these cells, diminish in number, so that the epiderm becomes more transparent, and allows us to observe the parts underneath. Now the axis of the tail becomes more distinct, and a fin is formed; in a very few days blood-vessels appear, muscular tissue develops itself, and the slightest irritation produces a certain amount of movement—a circumstance which proves that the rudiment of a spine contained in the tail has also been developed.

In about three or four days after the tail has been separated from the body of the tadpole—when the vital activity appears at its maximum—we have in this tail, as it were, a complete animal, breathing by the skin, nourishing himself with the vitellinous granules which are contained in all the cells, and manifesting reflex motion when excited externally—and even during the latter part of his existence, motion is observed without any external excitement at all.

Life diminishes, and finally ceases in this tail, probably from two causes: first, from the accumulation of materials that have served their purpose and should be ejected; secondly, from the diminution of vitellinous granules, by which alone the tail is nourished.

A discussion has been begun lately before the Paris Academy of Sciences as to whether the globules of vapour which constitute clouds, steam, fogs, &c., are liquid particles of water, or whether their envelope only is liquid, the interior of the little sphere being filled with a gas.

To explain the suspension of clouds, M. de Saussure, the once celebrated physicist, imagined cloud-globules to be hollow spheres of water of extremely small dimensions. He actually measured their diameters under the microscope, and, we believe, pronounced them to be elastic, like an india-rubber ball. In fact, observing minutely the steam which rose from a warm cup of coffee, he found that some of the globules rose whilst others fell and rebounded from the surface of the liquid. Sir Humphry Davy was the first, we believe, to prove that De Saussure's explanation was unnecessary, and that it was infinitely more probable that cloud-globules are liquid throughout, and not hollow spheres at all. Sir Humphry Davy's views have been proved to be exact by certain mathematical and meteorological considerations developed in France, first by the Abbé Raillard, afterwards by M. de Tessan.

If we were asked how is it that clouds remain suspended in the air, if the globules of which they are composed are liquid drops of water, so much heavier than air, we should be apt to reply, without mathematics, and in the Scotch fashion—how is it that finely-pulverised chalk will remain many days suspended in water, although it is so much heavier than the latter? Next comes the consideration; if the globules are hollow spheres, what do they contain in their interior? Not vapour, assuredly, for vapour condenses in contact with water. Do they contain air? That is likewise improbable: when we blow a soap bubble with a common tobacco-pipe, we produce a sphere of water filled with air, and we observe that its existence is excessively short; water constantly evaporates from the exterior surface of this sphere, and the liquid envelope soon becomes so thin that it bursts! It is absurd, then, to think that cloud-globules filled with air could exist more than five minutes. But the most serious, or apparently serious, objection to Sir Humphry Davy's theory was the following:—It was remarked that *rainbows* never showed themselves in clouds—a certain proof, it was thought, that cloud-globules are hollow, for if they were liquid throughout like the drops of rain, why should they not give rise to rainbows? The answer is simple enough: they *do* give rise to rainbows; and the reason why it is so difficult to observe the latter in clouds, is on account of their great distance from the observer. This may be proved experimentally: if we place ourselves between the sun and a garden fountain, so as to obtain a rainbow in the spouting water, by retiring from the fountain the rainbow becomes fainter, and finally disappears completely. Must we conclude that because we do not see it, it does not exist?

For the time being, therefore, the question is solved: cloud-globules are liquid drops, of various sizes. My distinguished friend M. Daubrée, Professor of the Faculty of Sciences of Strasbourg, some years ago searched for arsenic, and found it in many different kinds of rocks; but more especially in mineral combustibles (coal, lignite, &c.,) belonging to different strata. He found, at that time, that the tertiary lignite of Lobsann (Bas-Rhin) was uncommonly rich in arsenic: certain samples of this lignite were found to contain as much as 0·002 and 0·006 of their weight of arsenic. These observations have lately been confirmed by the same eminent philosopher, and under circumstances that deserve to be made known.

A limestone strongly impregnated with bitumen alternates with the lignite of Lobsann. This limestone forms the principal element of a kind of bituminous mortar, employed in the neighbourhood for different purposes. For some years it has also been employed to obtain certain pyrogenous oils, which are produced by a process of distillation. When the alembics which have been used in this distillation are taken down, the interior of the tube through which the oils distil, is often seen to be incrusted with a curious deposit produced by the gradual condensation, outside the furnace, of certain volatile substances. This deposit or sublimation was found upon examination to be pure arsenic, crystallised in rhombohedrons; it attains sometimes as much as two centimetres in thickness, and in the course of some months it will completely obstruct the necks of the retorts.

It was found that the arsenic thus deposited forms about one-millionth part in weight of the rock which is submitted to distillation. But the arsenic contained in the limestone in question, is not entirely condensed in this manner; a notable quantity distils over with the oils. In what state it

exists in these oils is not yet known. It is well to be aware, however, that arsenic does exist in them, as they are constantly employed for burning in lamps, &c.

The state in which arsenic exists in the bituminous limestone of Lobsann has, however, been ascertained with certainty by M. Daubrée, and in a very ingenious way. By alcohol, or any other appropriate solvent, the bitumen is dissolved out of the limestone; then the carbonate of lime is dissolved in its turn by diluted hydrochloric acid, when a residue, consisting of very fine non-crystalline particles, and amounting to about two per cent. of the weight of limestone employed in the experiment, is found to remain undissolved. These particles consist of *arseniferous iron-pyrites*.

It is well to note here that M. Daubrée formerly discovered arsenic in the limestone of the coal-formation at Villé, in France, and found that it was contained in the rock as minute crystallised particles of mispikel (arsenuret and sulphuret of iron), the small crystals of which were perfectly recognisable.

Photographic Societies.

Photographic Exhibition at Aberdeen.

We have been requested to call the attention of our readers to an intended exhibition of photographs at Aberdeen. The period chosen for this exhibition has been selected with the shrewdness for which our brethren on the other side of the Tweed are famous. Under ordinary circumstances, the visitors to such an exhibition would have been almost entirely confined to the residents of Aberdeen, so that the inducement to photographers in England to send prints would not have been sufficiently powerful at this season of the year, when all are so much occupied either in excursions about the country, or in preparations for such excursions. The managers of the intended exhibition, however, by selecting the time when the British Association holds its meeting in Aberdeen, have insured for English exhibitors an audience which they might fail to obtain even at the London Exhibition. The terms on which photographs are received are not very onerous. Coloured photographs are the only ones excluded, and supposing the positive to have been touched, or the negative from which it is printed, it is only necessary to state the fact. It is scarcely necessary, we presume, that we should advise the adoption of the recommendation of the committee, that all prints should be framed and glazed, as well as the other points which will be found detailed at length in the advertisement in another part of our pages. There is one point on which we would offer a suggestion: the circular says, with reference to the prints, "They should be marked on the back with the names of the subject, the process (collodion, waxed paper, &c.), the artist, and the owner." Instead of marking this information on the back, it appears to us that it would be much more useful if it were written on the face. If the owner objects to the defacement of his proof, this might be written in pencil, or on a separate slip of paper, so as to be easily removed after the termination of the exhibition.

It is not intended that the exhibition shall be confined to photographs only; makers of photographic apparatus who may have objects of new or improved construction are requested to send them to be exhibited before the 1st of September, by which date prints also must be sent.

We trust that any of our readers who may have prints which they may consider worthy of a place in an exhibition where they are likely to be seen by so many intelligent critics will not fail to forward them to the address given in the advertisement. We can with more confidence recommend them to do this, that they are not called upon to do it at their sole expense; the honorary secretary, Mr. J. White, undertaking that they shall be carefully repacked and returned free to the owner.

We think it would be a good plan, if Mr. White is aware of some of the special subjects which will be brought forward at the meeting, for him to state it, as it is possible that prints specially interesting in consequence of their illustrating a scene or a geological formation, might be forwarded, which, otherwise, the owner might not think it worth while to send, as the general impression with respect to the suitability of prints for exhibition is their possession of the quality of prettiness.

Miscellaneous.

Latest Foreign Art and Science Intelligence.—*Humboldt's Family Burial Ground, Tegel, near Berlin; his last Writings.*—Besides the loss of that *savant*, which is one universally felt, Europe has sustained a collateral one in the purchase of his huge library, by the United States Government, for the sum of 40,000 dols. This is an irreparable loss, as M. de Humboldt had occasion to collect in South America so many rare books and documents, as cannot be replaced any more. Besides, this collection comprises an immense number of engravings, maps, plans, &c., which are all going westward, to a new centre of civilisation.—We have seen an engraving of Humboldt's last resting-place, in the palace garden (*Schloss Garten*), at Tegel, where he reposes now with his also great brother William. On a fine parterre, surrounded by a circle of trees, rises, on an appropriate base, a column, surmounted by a statue representing Nature. Around this monument lies the family burial ground of the Humboldts, encompassed by a simple, yet pretty iron railing. Within this space, Alexander Humboldt is buried in the ground, as he wished to repose "in *free* nature;" an expression of which he was particularly fond, and used it very often. Amongst the last (if not the last) of Humboldt's occupations was the writing of a preface to a German translation of his journey, "Rélation Historique," which appeared first in 1817, in French. It is dated 26th March, 1859, and contains the following passage:—"Natural history, like Nature herself, is engaged in a continual change of existence. Since the appearance of the first volume of my Journey, forty-five years have elapsed. New additions, therefore, will be numerous; in a geological point of view, an account of the fixing (*Bestimmung*) of the various rock formations, and the metamorphosed mountains, as well as relative to the beneficent influence of chemistry on geology; and, in fine, as relates to the distribution of heat over the surface of the globe, and the causes of the diverse curves of the monthly isothermes." What sort of *translations* are generally made of works of great men, may be learned by an expression of Humboldt himself on the *former* translation of his *Rélation*. He called it "a blotch work, such as he never could take in his hand."

Panama.—In the vicinity of Hustaleo, in the Isthmus of Tehuantepek, the ruins of an old *Aztec* town have been found. They consist of fortifications built of stone, and of other most valuable antiquities. [All the hitherto published delineations of American *aboriginal* monuments are exceedingly meagre and faulty.]

Berlin—the Palace.—The Palace of Berlin had been built by Frederick the Great, during his struggles of war against Austria. On the western portal, the following *distichon* has been re-gilded of late, and thus has become visible:—

"Hæc sunt Friderici molimina: medio bello
Condidit is tantam belligerando domum;
Victori respondit opus: debebat in urbe
Non aliter Prussus Mars habitare arce."

Gent Art Exhibition.—Besides the fair and the target shooting of the Burghesses, the triennial art exhibition has also taken place at Ghent. The catalogue comprises 600 articles: the best are an Evening in High Mountains, by Steinecke, of Düsseldorff; an Italian landscape, by Bromier, &c. [It is to be observed, that almost all art exhibitions on the Continent are now open to the whole world.]

The Holy Land.—Mr. H. Scherer, who has explored the East most minutely, is now publishing, in the *feuilleton* of a German contemporary, a most interesting account of his journey.

Christiana.—The best Norwegian sculptor, Hans Richelson, has recently died aged 70.

Most Important Invention.—Mr. Auer, of Vienna, director of the huge paper-money printing offices of the Austrian government, but a man known as the inventor of nature-printing, has made another invention, which, if practically verified, will be another step towards the advancement of the *mechanical* part of literature. The fabrication of endless paper sheets has been known and extensively practised some time ago. Now, it occurred to Mr. Auer, that the whole process of rolling and unrolling, of preliminary cutting, &c., could be saved, if some means could be devised to print the paper as it comes out of the *womb* of the paper-making machine. This, therefore, would be the *ne plus ultra* of printing expediency—next door, if we may say so, to printing by enchantment. The German periodicals,

whence we derive this notice, have hitherto given only a superficial description of Mr. Auer's new machine, which, when more complete information reaches, shall be communicated to our readers.

Berlin—A Projected National Gallery.—At the meeting of the Royal Academy of Arts, Berlin, the plan of a National Gallery was taken into consideration, the necessity of which had been long felt. After the Senate of the Academy had assented to the proposed plan, the assistance of the Home Secretary was requested and obtained. A call was then made on the Artistic corps at Berlin, Düsseldorf, and Königsberg, to select members for the consulting committee, which has to mature the plan.

Paris—Academy of Arts—Prize Distribution.—The yearly distribution of prizes took place on the 16th inst., with all that *éclat* usual with our neighbours. The Home Secretary presided, and was supported by the Director General of the Imperial Museum, the members of the Academy, and the keeper and assistant keeper of the Museums. M. Fould delivered a discourse, as did also Count Nieuwerkerke. The prizes were allotted to sculpture, architecture, engraving, and *lithography*. As the latter art is also of recent origin, heliography will, we trust, also take up its place in due time.

Berlin—The Humboldt Memorial.—Some Prussian Cabinet Minister, members of the Academy of Science, and others, have joined into a society, to collect a fund destined for the encouragement of travellers to distant countries, in memory of the great defunct. The programme, signed by the first men of Berlin, states that they are aware of the difficulty of putting into existence a similar undertaking in times so difficult; yet "we do not hesitate to continue, in times troubled by war, the everlasting problem of science, the common tie of nations." It is the Academy of Sciences, at Berlin, who has undertaken the management of the affair, and subscriptions are to be addressed to the firm of Mendelsohn and Co., Berlin.

Lignitz Silesia.—The celebrated art and antiquity collection of General Minuto, who has made considerable researches in Egypt, but which extend over many other branches, will be sold by auction on the 1st August, and the following days.

Simplification of Apparatus.—We must confess with surprise, that the ingenuity of the mechanist has not kept pace with the research of the chemist—more particularly in those smaller inventions and adaptations of apparatus that are especially the province of the "handy-man;" for in the higher branches of mechanism, which partake largely of the scientific, such as the construction of lenses, &c., but little remains to be wished for. It is in the devising such apparatus as simplify manipulation, lighten a man's load on the hill-side, and enable him to wander with the least possible *impedimenta* from spot to spot, that improvement is most needed. We would wish to see the practice of travelling photography assimilated as much as possible to the freedom and ease of the sketching-block and moist-colour box; and though this is, perhaps, a little too much to expect, we believe that a very much nearer approach can be made to it than is generally imagined. The shops of photographic apparatus-manufacturers, resplendent as they are with polished mahogany and glittering brass-work, are sadly deficient in those little contrivances without which a photographer had needs be as *habile* a *prestidigitateur* as the great Robert Houdin, before he can hope for success.—*Irish Metropolitan Magazine.*

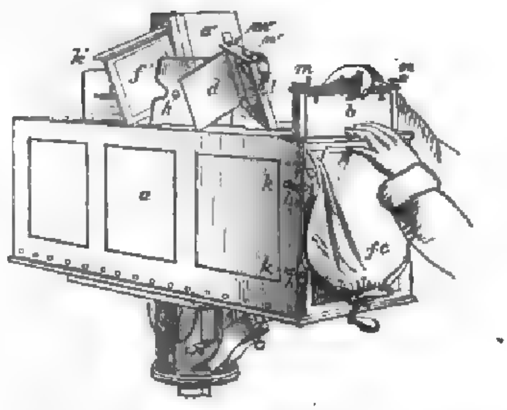
Photographic Notes and Queries.

IMPROVEMENTS IN THE PHOTOGRAPHIC CAMERA.

Sir,—Permit me to notice some omissions (page 164) in your report of my observations at the last meeting of the Photographic Society. I did not commend Mr. Malone's frame for the focussing glass, though it looks neat and compact, for I think it is liable to warp. I said that Daguerre originally had a door to the back of his camera, but I added, that the French, being too nice, and fearing that the current of air caused by the opening and shutting of the door would raise a dust, they *adopted the slide in lieu of the door*. I then said, that having my own cameras made with doors, and not being in the least inconvenienced by any dust, the fear of the French need not be entertained.

As regards the description of my camera, I beg you will allow me to supply, with the annexed cut, what at the meeting I find was not sufficiently explicit:—

A is a 12-inch square camera, and *a′* a 5-inch one; *f* and *f′* are the focussing screws, held in position by the elastic bands *h*, which are slipped over projecting knobs *k*; *b b′* are the backs; *b* is in the act of being slid down between the body of the camera and the screw, which it displaces; *b′* shows its inner door *d* open—the position it assumes during exposure. This door is opened and shut by means of the lever *m*; when closed, the bolt *l* is turned upon it 90° by means of the other lever *n*, which slides over a spring catch, and is prevented thereby from going back. The back is then ready to be withdrawn from the camera.



Attached to *f* is *fc*, a focussing cloth which consists of a black velvet bag; one end is fastened to *f*, and through the other end runs an elastic ring, which admits the head of the operator.

And now, sir, I come to the objection to swing-backs. With all due deference to Sir David Brewster, Messrs. Shadbolt, Malone, and others, the swing-back, or, according to Mr. Shadbolt, the front of the camera in the form of a cheese (a Dutch cheese, I suppose), is wrong in principle.

The axis of the lens ought always to be at right angles with the ground glass, and likewise as much as possible with the supposed plain, in which the object to be copied is situate. In the case of several objects in different plains, therefore, the camera must be inclined bodily towards the combined objects, putting the chief object in best focus, to the comparative neglect of the rest (if stopping is impracticable); then the chief object at least will not be distorted. But the moment the parallels *m* between the lens and the focussing glass are disturbed, *every portion in the whole image is distorted*.

The common experiment with a burning glass between any plain and the sun, will suffice to prove this. So long as the common axis of the sun and the lens is at right angles with the plain, the image of the sun is depicted as a circle; but, so soon as you incline either the lens or the plain, the sun is represented as an eclipse. N. Ennel.

GUTTA PERCHA DISHES.

Sir,—You invite contributions on the subject of gutta percha in connection with photography. It is open to great objection from its property of constantly contracting its dimensions. Built-up troughs soon become useless; they part at the seams, and though easily enough refastened, they are soon again out of order, and, from the trouble they give, are practically worthless.

Troughs moulded in one piece are far more satisfactory; but, from the same cause, soon get out of shape, and become no longer flat, so that a much larger quantity of the photographic chemicals are necessary in using them. To compel them to a comparative flatness I have, for several years, been in the habit of damping them to a board. This, also, renders them more safe to move; for when they have become contracted, and are, as it were, constantly labouring for a

relieved position, they are very apt to take a sort of twist whilst in one's hands, and throw their contents about the floor.

I have one gutta percha tray, which, when made, was about 46 inches in length and 14 inches in breadth. It is now (after about three years' use) *two inches and a half shorter*, and nearly half an inch narrower than at first.

F. L.

SEDIMENT IN THE FOTHERGILL PROCESS.

SIR,—Having practised Fothergill's dry process, and obtained the most beautiful results, I beg to seek your valuable aid and assistance, which you so kindly give to all who are in difficulties, for the only drawback which not only myself but others have met with, which is a kind of sediment that settles upon the plate during the developing, and all the washing you can give will not remove it. I keep the plate in constant motion, and change the developer frequently, and as often as it in the least changes colour, yet with all the care it will occasionally make its appearance, and completely spoil the negative.

It does not arise from any light getting on the plate, and I get some negatives quite clear of it by using the same developer.

I use the developer recommended for this process, 1 grain pyro., 20 drops acetic acid, 10 drops alcohol, and 1 ounce water, with two or three drops of *pure solution* of nitrate of silver to the drachm.

J. JOPLING.

OXYMEL AND SUGAR PROCESS.

SIR,—If Mr. Witham (page 191) will, after making his preservative sugar solution, as he describes (which is very good), add three ounces of water to one ounce of his syrup, he will find it to be sufficient. If, also, he will add (as Mr. Llewellyn recommends for his oxymel process) a grain and a half of nitrate of silver to two ounces of his diluted syrup, and also half a grain of citric acid to three ounces of such solution, he will find he has attained the most easy, certain, and perfect of dry processes. After the collodion is excited, wash the plate gently in distilled water, then take an ounce or less of the above sugar solution and pour it five or six times over the plate. Set the plate up to dry, and it may be used a long time afterwards. It gives perfect results. I have recently got a distant landscape, on a plate 8×10 (with a good lens, and collodion, and four minutes' exposure), a perfect result. This plate was prepared two days since, and I developed it when I came home to-day, after some hours' interval after exposing.

J. F.

INJURIOUS EFFECT OF A GUTTA PERCHA DIPPER ON THE BATH.

SIR,—Allow me, as you are on the subject of gutta percha, to relate a fact to you. A gutta percha dipper was in use in a 170-ounce bath; it was left therein for some time, and, the next time of trying the bath, was found ruined. The cause was that within the said dipper was a piece of thin iron to strengthen it, and there was a crack in the gutta percha which did the mischief.

S. E. C.

COPYING CAMERA.

SIR,—"Captain S. S. B.," who inquires in your last number about the dimensions of an "enlarging camera," would find that described in pp. 127 and 189 of your first volume,—a very useful size and easily constructed, if the inner camera be fixed by means of the wooden screw (to that part of the large camera which draws out) to the end farthest from the focussing glass. By causing the lenses to approach to, or recede from the negative, it may be enlarged to any required size; the size should be marked in pencil on the ground glass.

THOMAS BARRETT.

ANSWERS TO MINOR QUERIES.

SHELVES FOR HOLDING NEGATIVES.—*A Beginner.* A very convenient and secure receptacle for your increasing stock of glass negatives may be made in this way. Fit up, in some convenient part of your dark room, shelves of various width, according to the size of the glasses, and having grooves in them above and below (similar to a plate box), so that the glasses shall stand on their edges in them. A door with a lock and key should be provided for the double purpose of excluding dust and preventing damage from the hands of prying friends.

TEST PAPERS.—*N. W. W.* In using test papers observe the following precautions:—They should be protected from the action of the air, or they soon become purple from the action of carbonic acid, which is always present in the atmosphere in small quantities. By immersion in water, containing about one drop of liquor potassæ in four ounces, the blue colour is restored. Test papers prepared with porous paper show the red colour better than those made with glazed or strongly sized paper. If the quantity of acid present is, however, small, it is not sufficient in any case simply to dip the paper in the liquid; a small strip should be thrown in and allowed to remain for ten minutes or a quarter of an hour. If the paper, on immersion, assumes a wine red or purple tint in place of a decided red, it is probably caused by carbonic acid gas. In that case the blue colour returns when the paper is washed and held to the fire. Blue litmus paper may be changed to the red paper used for alkalies by soaking in water, acidified with sulphuric acid, one drop to half a pint.

TO CORRESPONDENTS.

CHURK.—1. White wax, when perfectly pure and free from adulteration (no easy thing to get, however), is without action upon a nitrate of silver bath, if kept in a tolerably dark place. 2. Several persons have experimented in the direction you point out, but hitherto with very little success. The difficulty is to preserve the white parts clean.

JUSTIN.—We fully agree with your sentiments, but, at the same time, are of opinion that the discussion should now drop.

A. B.—1. It would be impossible to advise you as to the best position for the sitter and blinds, &c., in your glass house, without a personal inspection of the building. We cannot fully comprehend your description. 2. See Mr. Hardwich's remarks on this subject in the present number. No. 1 lens is considered the best.

H. M.—1. Your plans and description arrived quite safely, and, but for an oversight, would have been acknowledged before. We are much obliged for them, and, probably, may avail ourselves of your permission to make them public in an early number. 2. Twenty-four hours' washing is not any too long for prints to be washed.

F. H. AMATEUR.—The two stereograms which you have forwarded to us are very good specimens of what can be done by the Fothergill process, and are quite good enough to entitle you to join the "Stereoscopic Exchange Club."

STEREOSCOPIC.—Your prints show that the negatives are not bad; but the printing might be improved, as at present the tones are too red to be generally liked.

S. E. S.—If you grind up the bromide of ammonium and alcohol together in a mortar, you will most likely find that it will all dissolve; at all events, any that is left undissolved may be disregarded.

M. O'L.—You could get a very good landscape lens from the maker you name for about £5, but a large portrait lens would be more expensive. Second-hand lenses are frequently advertised in our advertising columns; your best plan will be to consult them.

A PUZZLED PHOTO.—You will find it a far preferable plan to well wash the prints on removing them from the pressure frame, and then to tone them before fixing. Several good plans in which this principle is carried out, have been given in our former numbers. Of these, the one by Θ, near the commencement of the second volume, is as good as any.

JOHN CRABTREE.—You will not succeed in taking much better pictures than those you describe, by your arrangement of lenses. The front lens of the portrait combination is not intended for landscape work; for this purpose a properly constructed view lens is required.

C. H. PAINE.—Cement a few wooden laths on to the front and back of your gutta-percha bath, in such a manner that the rigidity thereby produced may contract the tendency of the bath to bulge outwards when full.

COPYIST.—We are much obliged for the information so politely given, but Mr. Sang's communication on this subject is so complete as to render it unnecessary for us to avail ourselves of your description.

J. BOCKETT.—A half-plate lens may be attached to a quarter-plate camera, provided the latter be lengthened sufficiently to allow for the greater length of focus of the lens. The advantage of this arrangement would be, that only the centre of the field capable of being covered by the lens would be used, and thus greater perfection in the details would be gained. In our opinion, however, a larger camera should be used for this size lens, as it would always be easy to work on a small glass, if desired. 2. The nitrate of silver could not have been pure. 3. The present hot weather is sufficient to account for your materials not keeping in good order so long as they usually do.

T. CLARK.—Received with thanks. See answer to *Justin*.

A. WATT.—Our correspondent's interesting article on collodion has arrived too late for insertion in this number.

Communications declined, with thanks.—F. Lake.—E. T. I.—A. B.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—A New Beginner.—Tyro T.—Nitrate Bath.—Pos.—F. O. U. R.

IN TYPE:—G. M.—J. S. Overton.—W. R. R.—Viator.—E. B.—M. A. Root.—G. H. W.—Peter Positive.—Artisan Amateur.—H. and J. Walter.—A. F. Stafford.—Thomas Warwick.—B. C. H.—R. A. W.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 47.—July 29, 1859.

THE GREAT COLLODION EVIL.

BY ALEXANDER WATT.

There is probably no chemical art which is so uncertain in its results as photography: even in the hands of the most skilful, it is always fraught with uncertainty and doubt; and there are many reasons why the artist cannot thoroughly depend upon obtaining uniformly good results, amongst which may be ranked first in importance *the want of uniformity in the collodion.*

It matters not who may have manufactured the collodion we employ—whether it be A, or B, or C, or the artist himself—there is always observable a vast difference between the article of to-day and that employed a week ago, although they may both have been procured from the same establishment, or made under the same formula by yourself. The best makers sometimes turn out a collodion which is almost utterly worthless, whilst at other times they will supply you with an article which cannot be surpassed. This is quite a lottery.

It is therefore advisable that we should turn our attention to some means by which we may obtain collodion uniform in quality. For my own part, I would rather work with an uniformly bad collodion than one which was excellent to-day and vile to-morrow.

I do not conceive that there is any special cause for the variation in quality of this substance, but am rather inclined to attribute its want of uniformity to *many* causes. Among these I may suggest:—

1. Ether varying in quality.
2. Pyroxyline being seldom made twice alike.
3. The iodising solution prepared with alcohol of various strengths.
4. The ether sometimes being prepared from methylated spirit.
5. The collodion being mixed at different temperatures and iodised under similar circumstances.

These I imagine to be some of the causes of collodion wanting in uniformity.

Now, although it is an Englishman's prerogative to grumble, it is also his right, when he has become satisfied with grumbling, to suggest a remedy for that which offends him; and I trust that collodion-makers and photographers will take in good part the few hints I am now about to offer them.

In making a batch of collodion, I would recommend the adoption of the following plan, and, let the collodion be prepared from whatever formula it may, I have no doubt that an uniform or *average* article will always be the result.

In the first place, in order to ensure uniformity of the ether, I would advise that it be procured always from several establishments, and let these then be mixed together.

Next, a quantity of pyroxyline or xyloidine should be carefully made, and, when dry, set aside in a box made of slate or other suitable material. Another batch of pyroxyline should then be made and this thrown into the box with the first lot, and so on, until several batches have been prepared, when they should all be carefully *mixed.*

The iodising solution should be made of various samples of alcohol, and be kept always at a moderate temperature (say about 50° Fahrenheit); and, before it is added to the collodion, the clear solutions should be decanted into a larger bottle, and be allowed to remain quiescent for several hours. When it is necessary to iodise a portion of the collodion, it should be ascertained if there are any crystals of the iodide attached to the sides or bottom of the bottle, which is very likely to be the case when the alcohol employed is anhydrous, and it should be carefully ascertained *what is the exact amount* of iodide that is added to the collodion, as much depends upon this, and the amount of course, to ensure uniformity, should never be allowed to vary. I think this point has been much overlooked, for when I have complained to a manufacturer that I have found a considerable deposit of crystals of iodide in his collodion, he has invariably remarked, "Oh, have you? Let it stand aside for an hour or two to settle." But I have found in several instances, especially in warm weather, that it has required to stand for several days before the collodion has been in a condition fit to use, and when I attempted to sensitise a plate with the collodion while in this state, it has been covered with transparent spots, evidently caused by the small crystals of undissolved iodide floating about the collodion. It would be well to keep the iodising solution in a graduated bottle, so that in case it loses by evaporation at any time, fresh spirit may be added to reduce the solution to the required strength.

By the above arrangement I have no doubt that collodion may be made from time to time with but little variation, if any, in the result. A manufacturer with a little extra trouble and care may always be able to obtain an *average* quality of ether, alcohol, pyroxyline, and iodising solution, and if this is *always* his practice, I think it will be almost impossible for his collodion to vary much at any time.

During the last few weeks I have extensively employed negative collodion made by seven different makers, and these have varied so much that the collodion obtained at the same house on five or six occasions each time possessed entirely different characters; in fact, one might naturally conclude either that the manufacturer used a different formula every time, or that he made it by the very uncertain process termed "guess-work."

Now, in proof of the advantage which may be derived from an admixture of the various substances employed, so as to gain an *average* sample of collodion each time, I have for years, whenever I have found A, B, or C's collodion work indifferently, mixed them all together, sometimes adding a little ether and alcohol, and I have always found that I thus obtained an article which would give me good results.

Some collodions, as no doubt the readers of this journal are aware, are more glutinous than others, and so much so that, after employing a thin collodion, it is quite unpleasant to work with a thick glutinous compound. But if two collodions possessing such different attributes are intimately mixed, a medium article is obtained, which I have generally found to work better than either separately.

Again, some collodions are apt to give too much half tone, whilst others are deficient in this respect; therefore, if two such collodions are blended, a "happy medium" is the result.

Whether the collodion be iodised with cadmium, ammonium, or potassium, neither of these salts is antagonistic to the other, consequently, no decomposition can result from mixing them; and I have found that, by mixing a collodion which has been iodised with cadmium—which does not become discoloured for months—with a collodion which has been iodised with ammonium or potassium, the mixture has

represented, in appearance and in lasting qualities, a *mean* between the two, and it has generally formed a very active and agreeable compound to work with.

When we find that it is difficult to depend upon any particular collodion, I think the safest way—in order to ensure *uniform* results—is to purchase some of this substance from half-a-dozen different makers, mix them all together and use the mixture on the following day; and if this plan is adopted, no matter how one or other may differ a little, we shall obtain an *average* collodion, and thus be able to work with a greater chance of obtaining uniform results—"a consummation devoutly to be wished."

PHOTOGRAPHY CONSIDERED IN RELATION TO ITS EDUCATIONAL AND PRACTICAL VALUE.

BY ROBERT HUNT.

* * * * * * We have not now to speak of any remarkable discovery, or to note even an especial achievement in photography. Of discoveries, we are not aware that there have of late been any; the scientific investigation ceased, or nearly so, as it always does, as soon as the art assumed that importance which makes it commercially valuable. All the manipulatory details have been carefully studied, and the causes of success or failure worked out with the utmost diligence, until an exactness has been secured, in the hands of the skilful, which almost surpasses belief. Not merely can the good photographer depend upon every plate he prepares, but he can prepare them at his ease and at his leisure at home, pack them in his portfolio, travel without encumbrance of chemicals, and develop his picture on his return. It was but recently that we witnessed such an experiment. Thirty collodion plates had been prepared; these, and the camera obscura only, were taken to the Continent. Thirty invisible pictures were brought home, every one of which proved, when developed, to be excellent photographs. Another advance, dependent entirely on manipulation, has been made. We have long possessed beautiful views of cities, of temples, and of palaces, but they were lifeless. The plague may have passed like a destroying angel, leaving the streets of the city desolate, turning the temples into tombs, and making the palaces the sad abodes of solitude and silence. These pictures are like the poet's Greece—

> "So coldly sweet, so deadly fair,
> We start, for soul is wanting there;
> *Theirs* is the loveliness in death,
> That parts not quite with parting breath;
> But beauty, with that fearful bloom,
> The hue which haunts it to the tomb,
> Expression's last receding ray,
> A gilded halo hovering round decay."

Pictures have now been taken of a London thoroughfare, with its noonday crowd. We have realised what Daguerre vainly hoped, when, in 1841, he informed the writer of this article that, *by means of my new process it shall be possible to fix the images of objects in motion, such as public ceremonies, market places, covered with people, cattle, &c.* This has now been effected by the collodion process. In one half of a second the prepared plate has been impressed with all the thousand details of the buildings and their adornments; men, women and children, cabriolets, omnibuses, carts, and horses, have all left their impressions upon the tablet. The human eyelids open and close less rapidly than the screen in front of the lens in the camera-obscura; in each case a picture of every external object is formed upon the retina of the eye, and upon what we may call the retina of the camera; a physical effect in one case, and a chemical effect in the other, gives to the mind a correct impression of everything which the sun has rendered visible. Add to this the use of the Stereoscope, and we may reproduce in all solidity each object in nature. Such is the position in which we find photography at the present moment. Let us consider its real value, first to art and then to the arts.

The Artist, looking at a photographic picture, may learn some of the mysteries of light and shadow which cannot be arrived at by any other study. If, especially, he examine the sun picture with a lens, he will discover that the effect of solidity is given on a plane, in a manner which it is the perfection of art to imitate, by a simple graduation of shadow. If he brings the stereoscope to his aid, he then calls into play some physiological phenomena, with which it is not our purpose at present to deal. The simple, single photographic picture teaches the combination of infinitely minute detail with that which we technically call breadth of effect. Although we have a thousand objects faithfully represented there is no sense of littleness, such [illegible] us in looking at many of our Pre-Raphaelite pictures. Everything is there, but no one object obtrudes itself upon the eye. A tree is represented with all its leaves, each leaf lying in a different position, relative to the incident light, and the result is not an assemblage of leaves but a tree, in all its unity; and a tree, too, which we can at once declare to be either an oak, an ash, or an elm, or some special member of the vegetable kingdom. There is no doubt about a photographic tree; we would that we could say so about many *artistic* ones. Sir William Newton, an artist and a photographer, says—"I consider it to be a sort of duty, as an artist, to recommend the student in art *not* to take up the camera obscura as a means of advancement in his profession until he has made himself well acquainted with the true principles of his art, as well as acquired considerable power of hand, with a view to draw with ease and correctness the *outline* of any object he may wish to represent. If, however, any student should imagine that the camera will help him to this desirable attainment, without the requisite study on his part, he will find himself much mistaken, when, perhaps, it will be too late to repair the injury. I am the more desirous of directing the student in art to the foregoing observations because I am well aware of the seductive nature of the practice of photography, and how it is calculated to divert him from his principal object in the earlier part of his studies." There is much truth in these remarks, and the want of attention to such advice is clearly showing itself in the productions of our young artists; and, indeed, there is evidence of its influence upon some of the pictures of some of our oldest *landscape* painters. There is a winning charm about the productions of photography which may well seduce the artist from his true path. The photographic picture of even the rotten stump of an ancient tree is so true—moss, fungus, ligneous structure, bark and all, are represented with so much fidelity, and all effected by light and shadow only—that the more we examine it, the more we are delighted with the result. We perfectly understand the desire of the young artist to imitate so perfect a production, and in this desire is the danger which should be avoided.

The result of taking a photographic study as a guide in the production of a work of art is that, however perfect the finished picture may be, it will want the evidence of MIND. No picture was ever painted—no matter how great the mechanical dexterity may have been by which it was produced—*which could live as a work of art*, unless it bore the impress of thought. Two pictures, painted by the same hand and, one a study from nature, in which the mind of the artist has been busy, and the other a copy from the most exquisite photographic picture, will present striking differences; one would represent living nature and the other nature dead. As a means for directing the mind to observe the minute details of Nature's works, and to study how she produces her beautiful effects, nothing can be more useful than photography. There is, however, that disposition to indolence in human nature that men will be led to copy direct from the photographic picture, rather than to study it and then copy from nature; and here is the mischief that photography is doing to art. The landscape painter, using his camera obscura properly, may greatly advance his art; the historical painter may catch the best expressions of his model, ere yet they have time to fade, and, from these, advance to the study of life with the finest effects; and the using photography so far, and no farther, will lead, eventually, to highest excellence.

The Engraver, whether upon copper or on wood, should find in photography a most important aid. The process of etching upon the steel plate, of precipitating by the electrotype process, a copper plate on a matrix, of cutting through the drawing upon wood, which has been produced by photography, in the first stage, cannot yet be regarded as successful. We have duly recorded, from time to time, the particulars of these attempts, which appear to us to have fallen into a state of slumber, from which, we believe, the art may be awakened to the production of the best results. Something has been done in the directions indicated, but in either of them the study of an observant mind is yet required to secure the desired perfection.

The Sculptor, by the aid of photography, may secure within his portfolio all the marbles of the Vatican and the rich treasure of our own museums. By the aid of the stereoscope he may study these in all the roundness of reality, and trace those delicate touches which, giving the semblance of life to stone, declare the greatness of the artist's mind.

The Architect, especially, should be a student of the art of photography. It enables him to preserve examples of every fragment of ancient or of modern skill within a space comparatively small. The recent photographic exhibitions have shown us the perfections with which Egyptian temples and tombs, with their myriads of hieroglyphic characters, can be copied; those of Greece and of Rome, in like manner, are brought home to us by photographic travellers; and those remains of hood and cowl devotion, sacred to us from the memories which crowd their moss-bemantled walls, and which are at the present time the favourite studies of the ecclesiastical architects, may be secured with the utmost fidelity, and preserved in portfolios for daily reference.

The Engineer has, in many different ways, availed himself of the advantages of photography. The royal engineers have, by means of the camera obscura, secured drawings of the land and coast fortification of different countries; and these have been obtained under such conditions that an exact measurement may be made from the photograph of every, or any, part of the stronghold, which is sufficiently correct for all military or naval purposes. The rule for this is a simple one. You have a picture of a fort or a tower, which is, on your paper, we will say, one inch high; this has been obtained at the distance of twelve inches from the lens, and the camera has been three hundred yards from the object. Now, "if twelve inches give one inch, what will three hundred yards give?" resolves the problem. At the recent Photographic Exhibition the staff of engineers exhibited the results of photography in their well-practised hands. The progress of great military works was regularly recorded, the camera-obscura supplying a report in every way superior to any report from a clerk of the works. At the Ordnance Map Office, under the direction of Colonel James, the reduction of maps from the six-inch to the one-inch scale is effected by photography, saving many thousands annually to the nation in the expense of reduction by the ordinary processes. The civil engineer has, in like manner, used this art to aid him in his works; and since Mr. Vignoles and the late Emperor of Russia employed the camera-obscura to register the progress of the work at the suspension bridge of Kieff, others have had recourse to the same means of recording the advancing of large undertakings in which they have been engaged. Machinery is now frequently copied by photographic means: thus, by one impulse, in a few minutes, the most elaborate system of wheels, cranks, piston-rods, &c., can be copied, which would occupy the ordinary draughtsman days, or even weeks. Patterns of parts of machines are also copied by the camera, and as these can be sent by post, time and money are economised.

The Weaver and Calico Printer may not only employ photography to multiply their patterns, but there is a prospect that the art itself may be made available for purposes of ornamentation. The use of bichromate of potash, for producing copies of natural objects upon cotton and silk, has been on several occasions advocated, and some very promising results have been exhibited. Attention has been confined to the salts of silver, but several of the salts of iron and other metals are susceptible of photographic change, and capable of being permanently fixed, while, by their use, a considerable variety of colours may be obtained.

The Schoolmaster—regarding that functionary as the public educator in the largest sense of the word—will find in photography numerous useful aids to study. Botanical specimens may be copied with a fidelity which cannot by any other means be obtained; the minute down upon the stalk, every delicate variation of the leaf, the structure of every part, can be shown and studied with a facility which is only excelled by the natural object itself. We have recently seen selected specimens of minerals copied by the stereoscopic camera, and inspected them with the stereoscope. It was difficult to believe that real crystals of quartz, of flour spar, and baryta, were not before you, so true were they in form, in colour, and in transparency. These and similar examples of fossil remains were intended for the use of schools. The three kingdoms of Nature, in all their infinite variety, admit of being thus treated, and they might thus be used with the best effect for the purposes of instruction. With the *stereomonoscope* of Mr. Claudet these results of high relief can be shown upon a ground glass to a class of any number. "I was led to think," says M. Claudet, "that it would be possible to construct a new stereoscope, in which, looking with both eyes at once upon a ground glass, at the point of coalescence of the two images of a stereoscopic slide, each refracted by a separate lens, we could see it on the surface in the same relief which is produced by the common stereoscope." This result has been obtained in the most satisfactory manner, and, no doubt, in a short time, we shall find this new form of stereoscope in very general use for such purposes as those suggested. Those who have examined the beautiful pictures of Mr. Lake Price—"The Rod and the Gun," "Fish and Game"—cannot but have been struck with the perfection of every part. The truth to nature is really a marvellous proof of the power of photography in the hands of a skilful operator. Some recent travellers in the East have brought home a great number of casts of the faces of the different native tribes of the Himalaya range and Thibetan valleys. The difficulty of transporting those has been very great. If these men had been instructed in the use of the camera, they would have equally served the science of ethnology, by obtaining and preserving photographic portraits of the peoples amongst whom they had travelled.

The Astronomer points the camera-obscura to the heavens. The sun instantaneously impresses his image, and marks, with all distinctness, those wondrous black spots which are so strangely connected with the temperature and the magnetism of our earth. The moon faithfully draws, by her own rays, those mountains and valleys which mark her surface, indicating a period of terrific disturbance, long since passed away. All is now quiet; but the grandeur of the rock-piled hills, and the terror of the deep chasms and vast gorges, tell the tale of convulsions, such as those which are indicated to the geological student upon this planet. Photography, too, promises to lend to the solution of the problem—"Has the moon an atmosphere? Is she fitted to be the abode of organised beings?" It is thought that the photographic moon indicates an atmospheric stratum of considerable density. The planets have also been pictured by means of photography, and some new facts have been observed which had hitherto escaped attention.

The Physicist—we have no other word in the English language than this sibbilating French derivative to express this class of natural philosopher—has employed photography to register the ever-varying temperature of the day and the year; the rise and fall of the barometer are, in like manner,

recorded; and the variation of the earth's magnetic intensity, however slight, are, by the agency of light, and a chemically prepared paper, detected and registered for every minute of the day.

Such are the numerous purposes to which photography has been applied. There are many others. It is scarcely necessary to mention the ordinary process of portraiture now so very common; but the extraordinary one of making the camera-obscura a detective officer, must not pass without a word. The portraits of convicted thieves are now regularly taken, and preserved in a gallery, to which constant reference can be had: thus every criminal leaves in the hands of the police unmistakable evidence against himself, to be used on a future occasion, if necessary. Photographic pictures may be adapted to the magic lantern; but we may soon expect to see the stereomonoscope employed with a similar object, and made an instrument similarly adapted to educational purposes. The solar rays fall upon the surface of the earth, and give rise to all the wonderful organisations which live and move, and have their being, upon the surface. Those rays are the supporters of life, and the developers of beauty, in form and colour. Not only do they, under the Supreme Cause, create organic forms, but they give to man the means of copying these creations in all their truthfulness. When the alchymist first noticed that horn silver (*the chloride of silver*) blackened by the exposure to the light, he little dreamed that he had made a discovery which was to lead to the great ends which now mark the photographic art. A few only of its useful and educational applications have been named. A brief contemplation of those few will prove instructive, showing the great importance of noting the most simple, apparently new facts, and proving that no new fact can be born into this world, however abstract it may appear to be, without its becoming, sooner or later, in various ways, of the greatest use to the arts of industry, and to the purposes of advancing the human mind. —*The Art Journal.*

THE SOLAR CAMERA.

We have been among the first to draw attention to a very important application of photography, which consists in producing upon the linen or canvas of a historical, landscape, or portrait painter, a rigorously exact representation or sketch of the subject which his pencil is to illustrate. It seems to us beyond a doubt, that in giving to the artist the real truth both in respect to the accuracy of the forms and design, and the fidelity of the perspective, we should double or rather centuple his powers; we should place him in a position to employ his talents and ingenuity under vastly more favourable conditions; we should almost place him on a level with the old masters, provided he thoroughly comprehended the secret of the palette, and was able to throw an appearance of life into the various expressions. During the last few weeks, all Paris has flocked to view for a last time the numerous and grand works of Ary Scheffer. We went with the rest, and up to a certain point we partook of the general enthusiastic admiration. But how many faults detract from the merits of this celebrated artist; how many striking imperfections tend each instant to throw into the shade the valued perfections! Ary Scheffer, in truth, only owed his success to the expression he threw into his heads and groups—he was pre-eminently the painter of sentiment. He drew badly and grouped badly; he hardly knew to what the effect of aerial perspective in a particular scene was due. How many times have the arms of his figures seemed to spring from the head, or behind the back! How often were the hands vulgar and shapeless, and the legs lengthened out to an immeasurable extent! . . . . .

Now, supposing that a photographer has furnished Scheffer with a canvas truthfully impressed with the forms, perspective, and atmospheric effect. Nothing, evidently, would have hindered him from producing real *chefs-d'œuvre*, and it would have been no longer true to say that the engravers of these immortal paintings often added considerably to the original work of the painter.

But in what way are we to obtain, on paper or canvas, images of an almost natural size, or, at least, as large as the one usually placed on a painter's easel? This important problem has already been solved in many ways. Some have had recourse to the gigantic lenses of Lebrun, Jamin, and Voigtlander, and have set these lenses to do almost impossibilities: with them the Bissons, Disderi, and others have obtained, in the first place, negatives, and next, positives, which were not without some merit. But these monster lenses are of an enormous price; and they require a very long time of exposure, since the focal image is always imperfectly illuminated.

Another very simple theoretical solution has received some applications in the hands of Quinet, Lerebours, and other skilled photographers. Imagine a person placed opposite a camera, and that his negative image is copied in the focus of the lens on a plate or sheet of paper; it is one of the first principles of optics that rays of light, starting from the image formed in the focus, and retracing backwards on their path, would depict the original object; and therefore, by illuminating the image, and substituting for the sitter a sheet of sensitive paper, placed in obscurity, the rays emanating from the image would depict a portrait of the exact size of life: it is simply the property of conjugate foci. The difficulty, by this method of operating, is to sufficiently illuminate the image or negative placed in the conjugate focus of the lens: and there is also another serious inconvenience in thus enlarging the image, independent of the faintness of the light, and that is, that all the imperfections are magnified at the same time, so that the images thus obtained, the positives resulting from the enlarging of the negatives are imperfect, both as regards clearness and sharpness.

We might mention some other solutions, but we must come to that of Mr. Woodward, which has given rise to this article. Mr. Woodward is an American painter, and his invention addresses itself more especially to painters, his *confrères*, but not so as to prevent photographers from profiting largely by it. We have lately seen it at work in the gallery now directed by M. Henry Badié, pupil of MM. Soleil and Duboscq. M. Thompson, M. Duboscq, M. Henry Soleil, and M. Bingham, the incomparable photographer of oil paintings, assisted us at these improvised experiments with this new instrument, and, like ourselves, were perfectly satisfied. We say *improvised*, because the apparatus was not properly fixed and adjusted.

Mr. Woodward frankly says that he has not invented any new principles: his apparatus is really nothing more than a solar microscope or magic lantern; but we are not aware of either of these having been before made use of under the same conditions for the reproduction of large photographic images. A mirror, inclined at an angle of 45° and of a large surface, which may be fixed to a heliostal, if great precision be desired, receives the rays of the sun and reflects them parallel on to a large condensing lens. Inside a box, of which the lens occupies the front, and in the axis of the rays which the lens has rendered convergent, is placed vertically the small negative image on transparent paper or glass, which is to give the magnified positive. Almost in the focus of these converging rays, at the apex of the cone which they form, is an ordinary camera lens, simple or compound; and on regarding the surface of this lens, the extremely luminous focus, or point of the cone, will be observed. The rays which have traversed the negative image diverge again from this focus or point, and proceeding onwards, form an image which will be magnified in proportion to the distance of the screen, upon which is placed the sensitive paper.

This screen is placed inside a dark room, in which only the rays issuing from the lens are allowed to penetrate. The surface which receives the image is usually a sheet of paper prepared with chloride of silver, rendered sensitive in a bath

of ammonia-nitrate, but Mr. Woodward has frequently operated on albumenised paper.

Stationed himself in the dark room, the photographer sees the positive printing before his eyes; he superintends and directs the action of the light; by the aid of screens he can suspend at his will the action of the light upon any part of the picture which seems to be getting too dark; and he can stop the action when he thinks it has obtained the desired intensity, and fix it by any of the ordinary processes.

Mr. Woodward has left at M. Badié's gallery a certain number of specimens of his beautiful work: two portraits of gentlemen, one of the size of life, and the other two-thirds the size, both superior to all that has hitherto been done of this kind; two landscapes taken on painters' canvas, which are very beautiful proofs; and a portrait of a little girl, whole-plate size, copied from a very small negative.

In general, the negative which is to serve as a point of departure for a positive ought to be rather faint, for all the details and half tints of the positive to be well preserved. Far from being an inconvenience, this requirement is a considerable advantage, because the negative may be taken in a very short time, and thus the time of setting may be much diminished; especially in the case of portraits of children, or reproductions of living animals, where a good dense negative is difficult to get.

It seems to us that the arrangement devised by Mr. Woodward will be very useful in the production of carbon prints by the methods of Poitevin, Pouncy, Salmon and Garnier, Lafon de Camarsac, &c.; it may be said to have appeared providentially to hasten this new and important step in photography, and we have, therefore, advised M. Disderi, who has resolved to put the last touches to the manipulations of M. Lafon de Camarsac, to carefully study this American apparatus.

We may remark, in conclusion, that a small print in carbon, representing the portrait of a young lady, which we sent to London, has much struck the English amateurs. Mr. Crookes, Editor of the "Photographic News," proclaims it irreproachable, and comparable to the best portraits printed by the silver process; he avows frankly that M. Lafon de Camarsac has far surpassed all the anticipation that the attempts of M. Pouncy had led him to form. What, then, will it be when M. Disderi shall have set his hand to the work with a full determination to conquer every difficulty?—*Cosmos.*

AUSTRALIAN NATURE—AND THE ART OF THE PHOTOGRAPHER.*

We begin to consider our present endeavour as something *novel*, viz., to sketch, in a short space, the features of a whole part of the world, in as far as designing art and photography are concerned. With the other parts of the globe, this would be a matter of compilation; with us it is autopsy, and the result of a sojourn in that—one of the *fairest* lands on the face of the earth. As the Andes have now found their depictor in the highest pitch of art, we trust that some spirited men of talent will also soon take up that future empress of the southern hemisphere. Australia has no sculptor like *Power* yet, as her elder sister of the western world; still, the art of the landscaper has already been somewhat exerted in its behalf. Leaving aside the *merely* geographical views of the older travellers, it is Westall, the painter of the Flinders-Brown Expedition, the landscapes of whom, included in the "Voyage," are of great merit. Twenty or thirty years ago, Mr. Glover, known at that time in the London exhibitions, settled in Van Diemen's Land; but we do not know whether the splendid sight of Table Mountain, impending, as it were, over the capital of Hobart Town, or the basaltic giant's colonnades of Cape Roul, &c., ever occupied his pencil. There have appeared of late some photographs of Australian scenery in London, but they are not of great value. Lithography, and even zincography, was introduced as early as the year 1834, in Sydney, and of the former some small but characteristic plates were then published. At that time, also, the first sheet of music was printed in Sydney.

But we have now to continue to point out those subjects which will interest the photographic artist. Although of comparatively recent origin, the Australian provinces can boast of some *historical* scenery, which deserves well to be represented in the highest scale of art. Apart from the landing places of *Abel van Tasman*, alluded to in the former article, it is James Cook and Joseph Banks who forcibly strike the imagination of every Englishman. On those precipitous sandstone rocks of the south shore of Botany-Bay, a modest brass tablet (erected by Governor Brisbane) points at the spot where the *Endeavour* first cast anchor in the Bay; outside heave the waves and rollers of the South Sea. Another most interesting scene is the little brook, somewhat farther west, near the banks of the Bay, the watering-place of Captain Cook, so well described in his Journal; and it was these identical shrubs and plants growing around, which Banks and Solander first examined, and which, by their novelty, astonished Europe, and gave Botany the appellation of a Bay. On the north shore of this inlet is the modest, yet interesting monument erected by the French Government on the spot where the unfortunate La Peyrouse and his expedition had stopped last, and was then never heard of no more. The Government House, Sydney, the first built in the country, the abode of some talented and worthy men, like General M'Quarry (called *old* M'Quarry), Thomas Brisbane, &c., deserves to be preserved for posterity. Here, therefore, we have arrived at the highest vocation of photography, viz., to preserve in life-true delineations sites, as they were when first trodden by the white man and civilisation—sites, the more important at a future period, when the destinies of these countries will have become more defined and developed. Antiquities, properly so speaking, the main land of New Holland has none, except the tracks and roads trodden out by the naked feet of the wandering native tribes, through the succession of centuries, even in the barren rocks. Some such, as they are met with, for instance, in the Australian Alps, ought also to be carefully preserved in large plates. We may state here, that such photographs ought to be taken soon, as the onward wave of civilisation and population will, ere long, roll over these localities, and cover them with their often unmeaning gloss. If, however, the Legislatures of the Five Confederated Provinces should each only vote a moderate sum, some *opus ære perennius* could be produced, as we shall detail hereafter.

Although there does not yet exist a general physical description of Australia (a work, after all, perhaps yet premature), still, valuable data have been laid down both in books as well as in periodicals. Botanical geography being one of the chief departments of such a description, claims first our attention. Robert Brown says, that one-fifth of the whole vegetation of Australia consists of *gum* (Eucalyptus), and he is right; but of this genus more than fifty species are already known, and each, so much varied in size, form, foliage, colour of bark, &c., impart to the scenery an especial character, and photographs of such scenery would be amongst the most striking, interesting, and instructive. There are gum trees in Australia upwards of a hundred feet high, of a gigantic stem, the bark of which is as if painted with some white varnish, the (perennial) leaves being of a lustrous colour. Some smaller, shrub-like species, widely diffused, have leaves quite *silvery*, and the traveller thinks that he is pacing through one of the gardens of Armida. What photography can do *now* (only thirty years after its invention), is to give us a most correct and life-like delineation and shading of the scenes subjected to its process. What will and can be yet done for the equally life-like colouring and tinting of such plates, their manifold reproduction, &c., lies also in the womb of futurity. But great occasions and great scopes will and must produce great

* Continued from vol. ii. p. 283.

results! If we add to the Eucalyptus scenery that of the flower-meadows and shrubberies, the Acacia forests, before alluded to, all over the country; the palm groves of Morton Bay and Port Essington, the thickets of arborescent ferntrees (Alsophylla Australis), we may have stated enough for the present scope of the photographic artist and traveller. Mr. Church's picture of the Andes already indicates, what different aspects and characters will appertain to the landscapes of distant countries, if once seized by a perfected photography, and the Claude Lorraines and Poussins of a future time.

(To be continued.)

Critical Notices.

The Photographic Tourist. London: F. J. Cox.

THE facts connected with photographic manipulations are few; and most writers who profess to treat of this or that process, describe it in a set form of words, very much resembling the style of a recipe in a cookery book; only, instead of beginning, "first catch your hare," it runs, "first clean your plate," the importance of which operation is enforced in such very emphatic language, as to fill the soul of the young photographer with affright. We admit that there is one advantage attending this concise, not to say abrupt, method of treating the subject, which is, that a young photographer may get the whole thing off by rote, and may go through the manipulations in a systematic manner, even if he can give no reason for the results produced.

In the book before us, the title of which is "The Photographic Tourist," we have a work of very comprehensive character. It commences with a description of the apparatus necessary for a tour, giving cuts of the various objects, beginning with the envelope, and going through the whole series, from the camera to the plate-holder, and describing the different photographic processes, from taking the picture to printing it.

Dictionary of Photography.

FIXING.—This term is applied in photography to the operation by means of which the picture is prevented from undergoing further change by the action of the light. This is effected either by pouring over the sensitive surface a substance which is capable of preventing any further change, such as solution of bromide of potassium, or by entirely dissolving away the unchanged sensitive substance by an appropriate solvent, such as ammonia or hyposulphite of soda. In practice, the latter salt is almost exclusively employed.

FLUOROTYPE.—A name given, by Mr. Hunt, to a photographic process in which fluoride of silver, associated with bromide of silver, is the sensitive surface employed. The paper is first washed over with

Floride of sodium	5 grains,
Bromide of potassium	20 grains,
Water	2 ounces,

and when dry a 60 grain solution of nitrate of silver is brushed over it. The paper so prepared is said to keep for some weeks without injury, and requires but a short exposure in the camera. The development is effected by means of a dilute solution of protosulphate of iron, and the image, when fully brought out, is fixed with hyposulphite of soda in the usual manner. It was in experiments on this process, and its modifications, that Mr. Hunt obtained images in which the traces of natural colouration were distinguishable.

FLUORESCENCE.—A remarkable phenomenon of light first observed by Sir J. Herschel and Sir D. Brewster, but not thoroughly investigated until Professor Stokes turned his attention to it, and, in an elaborate analysis of the whole subject, made the important discovery of the possibility of rendering visible to the eye the chemical rays of light. The experiments which were devised by this gentleman for the above purpose have taken their place as some of the most important scientific investigations; and as the plan which he originated is the one almost universally adopted in researches on the more refrangible rays of light, and is constantly spoken of and referred to by writers on physical optics, we are induced to append at length the discoverer's own account of the phenomena, as given in the report of a lecture which he delivered at the Royal Institution of Great Britain, and which has been placed at our disposal by the kindness of the Rev. J. Barlow, the honorary secretary of that Institution:—

"Before proceeding to the more immediate subject of the lecture, it was necessary to refer to certain discoveries of Sir John Herschel and Sir David Brewster, more especially as it was the discovery by the former of these philosophers of the epipolic dispersion of light, and of the peculiar analysis of light which accompanies the phenomenon, that led to the researches respecting the change of refrangibility.

"When a weak acid solution of quinine is prepared, by dissolving, suppose, one part of the commercial disulphate in 200 parts of water acidulated with sulphuric acid, a fluid is obtained which appears colourless and transparent when viewed by transmitted light, but which exhibits, nevertheless, in certain aspects, a peculiar sky-blue colour. This colour, of course, had frequently been noticed; but it is to Sir John Herschel that we owe the first analysis of the phenomenon.* He found that the blue light emanates in all directions from a very thin stratum of fluid adjacent to the surface (whether it be the free surface or the surface of contact of the fluid with the containing glass vessel), by which the incident rays enter the fluid. His experiments clearly show that what here takes place is not a mere *subdivision* of light into a portion which is dispersed and a portion which passes on, but an actual *analysis*. For after the rays have once passed through the stratum from which the blue dispersed light comes, they are deprived of the power of producing the same effect; that is, they do not exhibit any blue stratum when they are incident a second time on a solution of quinine. To express the modification which the transmitted light had undergone, the further nature of which did not at the time appear, Sir John Herschel made use of the term 'epipolised.'

(To be continued.)

The Amateur Mechanic.

GUTTA PERCHA—*(continued)*.

IN dishes intended for developing, or for washing away the superfluous nitrate of silver in preparing plates for a dry process, it is frequently desirable to have some means of resting the plate, face downwards, without injuring the film. As a means of effecting this, a small bridge may be formed of a strip of gutta percha to span the dish. Instead of having the usual arch of a bridge, the arch should be reversed so as to hang into the dish; the ends being supported on the edges by hooks formed at each end. A sectional view of the bridge would be something like the following figure:—

The curve at the bottom should be formed so that the edges only of the plate come in contact. This, when in use, should be placed over one end of the dish, so that the plate may rest with one end on it, and the other on the bottom of the other end of the dish. This bridge will be easily formed by softening a strip of gutta percha—say, half an inch broad and one-sixth of an inch thick—in hot water, and fitting it to the dish with which it is intended to be used, whilst it is soft. There will be no need of attaching it to the dish. Where a dish is intended to be kept expressly for the purpose of which we are speaking, permanent rests for the plate may easily be applied. Small pieces of gutta percha, one for each corner of the dish, should be prepared; if the dish be very slightly larger than the

* Philosophical Transactions for 1845, p. 143.

plate, pieces about a quarter of an inch square, or very little more, will be large enough. These should be slightly heated at the sides of contact by the flame of a spirit lamp, and the corners of the dish at the same time heated by a piece of hot iron, or thick wire. The pieces must then be put in the corners and held there until cool and firmly fixed. A dish for either developing or washing the plate with its face down, without injuring the film, is thus easily made. For removing plates from such dishes, a hook of silver wire is useful, or, what will answer the purpose quite as well, a hook of common wire coated with gutta percha. The best mode of covering wire with gutta percha, for this and other purposes, we shall in due course describe.

The photographic tourist will generally find it convenient to have his dishes "nested"—a set, one fitting within the other. If the method of making them on moulds be selected, this will be a somewhat troublesome operation, involving the necessity of a complete set of moulds. If the simpler plan of making the dishes we described in our last be adopted, the nesting becomes an equally simple process. The proportion smaller which each dish, intended to fit into another, must be made, will easily be ascertained by measurement or calculation. Thus the outside dimensions of the inner dish must always be a little less than the inside dimensions of the outer one; to secure this, proceed to cut out the set, say of three, at once from the sheet. The inside dimensions of the largest are to be, we will suppose, 7½ inches by 5½ inches, and three-quarters of an inch deep. The piece of gutta percha must, therefore, be nine inches by seven. If the sheet be, as we will suppose, one-sixth of an inch thick, the size of the next dish must be just twice that proportion, that is, just one-third of an inch shorter and narrower; as it would, probably, fit too tight, if merely the exact proportions were allowed, it would be better to allow half an inch, so that the piece for the second dish would be 8½ inches by 6½ inches, giving a dish, when the sides of three-quarters of an inch were turned up, of seven inches by five inside measurement. The size of the third piece would be 8 inches by 6 inches, giving a dish 6½ inches by 4½ inches inside measurement, and so on, for as many as may be required.

In our last we gave the proportions for a solution of gutta percha. As that was for a specific purpose, and solutions of gutta percha have been proposed for a variety of purposes in connection with photography, it may be important to say a few words more on the subject. Gutta percha is, as we have before stated, soluble in bisulphide of carbon and in chloroform without heat; and in benzol, camphine, turpentine, and mineral naphtha with heat. Of these solvents, chloroform or benzol should be chosen as least liable to any photographic objection. Common mineral naphtha possesses some property, apparently of a greasy nature, which prevents a solution of gutta percha prepared with it from adhering properly to anything; the same is true, we believe, of turpentine.

A solution of gutta percha has been proposed as a preservative varnish for positives on both glass and paper. For a purpose of this kind, about 30 grains of gutta percha to an ounce of solvent would be quite sufficient to form a good protective film. If benzol be used as the solvent for such a varnish, it must be remembered that, unlike other benzol varnishes, it will require the aid of heat to prevent it chilling in drying, and it is even then apt to become slightly opaque, if at any time the film is subjected to a low temperature. This opacity, should it occur, may be removed by the application of heat. The risk of opacity may be avoided, however, by using chloroform instead of benzol as a solvent, in which case all chance of chilling is avoided.

A film of gutta percha to support the film of collodion has also been proposed as a substitute for glass. We believe two methods of using the solution for this purpose were patented by the late Mr. Scott Archer shortly before his death. One method was to pour the gutta percha solution on the glass plate, and when it was set, coat with collodion and manipulate as usual, removing the film of gutta percha and collodion together when the picture was complete. In the other method the picture was taken and completed in the usual way, and when dry coated with the gutta percha solution; the two films were subsequently separated from the plate prior to removal by immersing it in water. Whether either of these methods have been prosecuted with success, we cannot say. In regard to the first, there is some difficulty in preventing both films leaving the plate together whilst in the nitrate bath. The second method we have not tried with a negative, but have used it successfully as a means of transferring a positive from glass to leather or cloth. For this purpose about 30 grains of gutta percha to the ounce of solvent would be sufficient; and chloroform would be preferable for the purpose to benzol. As a matter of economy, methylated chloroform would answer the purpose quite as well as pure.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 25*th July*, 1859.

MY friend, M. Jobard, in his large work, *Les Nouvelles Inventions aux Expositions Universelles*, which I criticised rather severely the other day, thus speaks of M. Niépce de St. Victor's curious discovery on the "New Action of Light": "A body having been exposed to the rays of the sun, does it retain, when placed in the dark, any properties of this insolation? That is what remains to be seen, said to himself the nephew of the inventor of the Nièpceotype, and he immediately exposed to the sun an engraving that had been kept for a long time in darkness; the engraving was then placed upon a sensibilised photographic paper. The result was that the white portions produced their effect, and that a reversed image of the engraving was printed on the paper, by means of which, as a negative, copies of the engraving might be produced *ad infinitum*.

"This process, which requires neither talent nor tools, will be found extremely useful by those poor devils who, having no profession of their own or sinecure under government, are reduced to the hard necessity of fraudulently imitating bank-notes. Happily the government of Great Britain has just authorised an indefinite multiplication of notes by the Bank of England, by granting it an indemnity bill.

"One hopes that this augmentation of riches will put a prompt end to the present crisis.

"The discovery of M. Niépce de St. Victor could not have happened more *apropos*.

"The Bank of France, which is less generous, has asked the Bank of England, we are told, to inform it of a method of preventing the 'solar re-printing' of its paper. In our opinion, the poor lieutenant (M. Niépce) has a right to a large sum of money for having thus inaugurated the era of the association of talent and capital."

I must now call attention to a letter inserted in the last number of the *Photographic Journal* by a Mr. C. J. Burnett. In this letter, Mr. Burnett claims to be the discoverer of Niépce's "new action of light," or, at least, of some of the details of that discovery. If Mr. Burnett will forward to me any papers, data, &c., or furnish me with any means of judging of these claims, I shall be happy to make his right to the discovery known both in France and in England. As to the extraordinary letter Mr. Burnett has inserted in the *Photographic Journal*, I am surprised that he should have written it, and that the *Photographic Journal* should have had the bad taste to insert it.

M. Niépce has been making some very curious experiments on the chemical changes undergone by starch, and other organic substances, under the influence of light. We all hope that he will not keep us long waiting for his first paper on this new subject. It appears that starch, for instance, suspended in water, with a slight quantity of any metallic salt, and exposed to the rays of the sun for a certain time, is converted, first into dextrine, then into grape-sugar. M. Niépce believes that he has produced cane-sugar in this manner. If this result be confirmed, it will constitute one of the most important discoveries of this century. The experiments were made in glass flasks, and the substances obtained were recognised, not only with the ordinary chemical

re-agents, but also by their optical properties in the polariscope. By the nature of the deviation of a ray of polarised light, M. Nièpce assured himself, that when the starch or dextrine disappeared, it gave rise to grape-sugar or cane-sugar. It would appear also, that in these new investigations the organic substance is transformed in presence of a metallic salt, and under the influence of solar light, into some entirely new substances, that present none of the chemical re-actions manifested by starch, dextrine, sugar, &c. Finally, we may add, though with a certain reserve, that grape-sugar may be transformed, by the action of light alone, into oxalic acid.

The above facts I communicate to you from verbal communications, M. Nièpce having published nothing yet concerning them.

I do not feel convinced that all the effects observed are to be attributed to light alone; chemical affinity determining fermentation and electricity, may perhaps have an equal part with light in the production of these phenomena.

The experiments are being continued in M. Nièpce's laboratory, at the Louvre.

The *Cosmos* gives this week a long article on "Positives, natural size," in which some enormous proofs, obtained by Mr. Woodward, an American photographer, are spoken of in a flattering manner. The writer thinks that these large proofs may become useful to painters, portrait painters, landscape painters, *peintres de genre*, &c., by allowing them to dispense with a knowledge of drawing. I am not, however, of this opinion. I believe that photography will never be useful *in that manner* to artists. The way in which photography has, to my knowledge, proved most useful to artists up to the present time is, by the 'reproduction' of pictures.

The Société Hollandaise des Sciences, of Haarlem, has just held its 107th annual meeting. Five memoirs in French and Italian were received by the society in answer to prize questions proposed for this year. None of them were considered worthy of the prize (a gold medal of 150 florins), or important enough to be inserted in the memoirs of the society. The latter publishes a long list of questions proposed for 1860 and 1861. These, together with the conditions of the competition, may be had on application to the secretary of the society, M. Van Breda.

M. Pasteur has been making numerous observations on alcoholic fermentation. From time to time he communicates the results he arrives at to the Paris Academy of Sciences. These results have become already extremely interesting. M. Pasteur still insists on regarding alcoholic fermentation as essentially due to the vegetation of a minute cryptoganic plant, "the ferment," or the "yeast plant." This view was put forth many years ago by M. Cagniard de Latour, whom the hand of death has so lately taken away from us, and has been contested as insufficient to explain the phenomena observed by more than one eminent chemist. According to Lavoisier and Gay-Lussac, when sugar ferments it is changed into alcohol and carbonic acid,—100 parts of sugar, according to their theory, was decomposed by the mysterious influence of the "yeast plant" into 51·34 parts of alcohol and 48·66 of carbonic acid. The alcohol remains in the solution—the carbonic acid goes off in the gaseous state.

According to M. Pasteur, the theory is not quite so simple; other substances are formed besides carbonic acid and alcohol, among which the most unexpected are glycerine and succinic acid. The former of these substances forms part of fatty matters, the latter is generally derived from amber (succinum), though it has of late years been produced in a variety of ways, such as the fermentation of malate of lime by means of cheese, &c., and has been found in plants of our climate.

In *resumé*, then, out of 100 parts of pure sugar submitted to fermentation, from 5 to 6 parts do not decompose into alcohol and carbonic acid, but are converted into succinic acid, glycerine, and a few other products which have not yet been examined.

But what is still more striking, wine, as we all know, is formed by the alcoholic fermentation of the sugar contained in the juice of the grape. M. Pasteur naturally supposed, therefore, that wine would also contain glycerine and succinic acid. He evaporated a litre of wine (about a pint) and obtained a residue weighing from 15 to 25 grammes (according to the species of wine employed), from which a considerable quantity of glycerine and succinic acid were obtained. I doubt if these substances were ever before recognised in any description of wine. M. Pasteur found that a litre of wine contained from 5 to 8 grammes of glycerine, and from 1 gramme to 1·5 grammes of succinic acid.

Dr. Phipson has made known an easy method of analysing phosphates of lime, such as the "superphosphates" employed in agriculture, &c., and of effecting the quantitative separation of the lime and the phosphoric acid. The latter is thus effected:—The phosphate of lime having been dissolved in hydrochloric acid, an excess of acetate of soda is added to the solution. In this manner the whole of the free hydrochloric acid is transformed into chloride of sodium, and is replaced by a corresponding quantity of acetic acid. Now, as oxalate of lime is not soluble in this free acetic acid, the whole of the lime may be precipitated by oxalate of ammonia. The precipitate is washed, dried, and calcined. It is weighed as carbonate of lime, or as quick-lime, according to the heat employed in the calcination. The phosphoric acid in the filtrate is determined in the ordinary manner, as phosphate of ammonia and magnesia.

M. le Baron Cagniard de Latour, member of the French Institute, has gone from among us. He died at the age of eighty-two.

This eminent *savant* was born at Paris in 1777. His first studies were made at the Ecole Militaire of Rebais and at the Ecole Polytechnique. We owe to him many curious and useful discoveries. The first was that of lucifer matches, which has given rise to a branch of industry that has spread over the whole globe. He proved exceedingly useful to the French Government in 1814, by the invention of a new machine for the manufacture of gunpowder. He was the first to show the exact nature of the "ferment" or the "yeast plant." In studying the action of aqueous vapour at a high pressure on wood he produced a sort of artificial coal, and it is believed by some that he once succeeded in the artificial formation of the diamond. For the rest he has given us a great number of scientific memoirs on physics, especially on acoustics—a branch of knowledge for which he had a great predilection. In 1819 M. Cagniard de Latour invented his *Sirène*, a small but extremely ingenious instrument for determining the exact number of vibrations of which any given sound is composed.

M. Bécquerel pronounced a most flattering discourse over the tomb of this once eminent and laborious philosopher.

A PHOTOGRAPHIC TRIP UP THE WYE.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—I would not advise any of our *confrères* who may visit the Wye to trust themselves with their camera in a very curious kind of boat which they will see in use there. These boats, or coracles, or truckles, as some of the people seem to call them, are made of canvas, either tarred or painted, but I think tarred, and stretched tightly over wicker-work. They are used by the fishermen and cost very little, and though they are easily damaged, if the bottom comes in contact with a piece of rock, they are just as easily mended. They furnish another instance that the progress of modern times is not always able to improve on an ancient invention, even when, as in this case, the invention is as old as the Druids. I am better able to advise photographers on the subject of using these coracles, as I myself have had practical experience of the dangers attending their use. I wanted to take a picture or two of a spot we had passed on the previous evening, and as it seemed unnecessary trouble to go back with the boat, I put my camera and a box with half-a-

dozen plates prepared by the Fothergill process into a coracle and paddled down to the spot selected. I reached it without misadventure, got my negatives, and was leisurely paddling back, when I suddenly caught sight of a piece of rock in the stream just ahead of my cockleshell. I made a hasty movement to avoid it, and succeeded; but in avoiding Scylla I tumbled into Charybdis; the fragile vessel turned over and took in a quantity of water, and it was more a chance, I believe, than anything else, that I saved it from going over altogether and spilling me in the bargain. As it was, I only lost the result of my labours, for the plate box being in the bottom of the coracle, got filled with water. Luckily my camera escaped, because having been told that I should probably make a hole in the bottom of my conveyance, I passed the tripod through the handle and placed it across the machine, so that the camera was suspended, and consequently escaped a wetting.

The river, from Monmouth upwards, offers many charming scenes for the photographer, who may multiply the number of his negatives to almost any extent he pleases. By the time I reached New Weir I had added fourteen to those I had up to the time of my leaving Monmouth. The scenery along this part of the river may well be termed grand. Great fragments of the cliff jut out in all kinds of fantastic shapes, and lie at the foot in great rough pieces. The cliffs are very steep, and every now and then you see the gaping mouth of a cavern, into which the light penetrates to so slight an extent as to make it very difficult to get a good negative of the spot in which it occurs. There are lots of legends attached to these caves in which King Arthur and his knights figure, and how there was once a man who entered the cave in which this king and his knights were enchanted, and was rewarded for his boldness with a bagfull of gold—and how the spirit who guarded this cavern raised a barrier which has always since that time prevented inquisitive mortals who have tried to find the entrance from succeeding. Some parts of the river are so thickly overhung by trees as to make it difficult to get a picture, and I have had to expose on some occasions as much as twenty minutes when working with the dry process, though this process was Fothergill's, which I consider to be by far the most sensitive of all the dry processes.

On reaching the New Weir, we left the boat and spent a couple of days in making excursions in the neighbourhood—a proceeding I would recommend to any photographer who may decide on following the same route. There are many very pretty scenes in the neighbourhood, and one on the spot which I took, but forgot to mention, and that is the "Fall," which is really a very pretty picture. At least, two very good negatives may be got of "Symond's Yat," a hill, probably about a thousand feet high; and even if one does not feel disposed to take a picture, it is worth while walking up it for the sake of the view it commands: on one hand the Forest of Dean extends for a long distance, the dense and varied green of the foliage, marked here and there by the spire of a village church, and the light blue smoke curling upwards from a village which is hidden from the eye, adding to the beauty of the scene, and breaking what might otherwise seem the monotonous succession of trees which pass under the eye before it reaches the beautiful country beyond, and which they tell me comprises a portion of three counties. Following the windings of the Wye, the eye encounters scenery of the loveliest description, dotted here and there by objects which add to its interest. One of these objects which attracts attention most strongly is Goodrich Castle, about a mile distant in reality, but supposing the eye to have followed the river, it has passed over a distance of six, or, as some say, seven miles. The view in this direction is bounded by the Welsh mountains, and this, perhaps, is the view which will most delight the photographer, especially if he be a London photographer, whose business confines him to that city during a great part of the year. After I had spent all the time I had to spare in admiring the various views that are offered from this hill, we descended and took our way across the meadows to Goodrich Castle.

The castle is a fine ruin; I think the finest I ever saw. It must have been a splendid pile before it was dismantled; even now one can see that it possessed all the appurtenances of the old feudal castles, and was duly defended by barbicans, ballium, and other outworks, which must have made it a place of great strength. When it was erected I am not aware, but there is no doubt as to its great age, nor any as to the solidity of the walls. Besides one large negative of the general appearance of the ruins, I took three stereoscopic pictures, and, but for an unfortunate piece of forgetfulness, which I greatly regret, I should have taken some others: this forgetfulness had reference to the plates. On taking out the plates I had used from the box, on the previous evening, I forgot to replace them by others, and had started under the impression that the box was filled as usual. I have additional reason for regretting this, as it prevented me from taking negatives of a place which is even more beautiful as a picture than that just referred to—I mean Goodrich Court, a building which is in the exact style of a castle of six centuries ago. Its bartizans and tall conical spires, and battlemented turrets, give it a most picturesque appearance when regarded at a short distance, so as to bring the detached flag tower and other buildings into the view. Its position being on a promontory overhanging the river, not only renders it visible at a great distance, but gives it very much of the appearance we notice in some of the castles on the Rhine. To approach the Court you have to cross a drawbridge, and go through a gate defended by a portcullis and round towers. The inside of the building, at least of that part which is not entirely devoted to domestic arrangements, is quite in the style of the old feudal castle. Most of your readers are, doubtless, aware that Goodrich Court is famed for its collection of ancient armour, made by the late Sir Samuel Meyrick, who likewise built the Court; and with great thoughtfulness for the comfort of travellers, for which I, as a wandering photographer, feel grateful, a very nice little inn in the adjacent village, which he named "The Hostelrie," which was to be an exact imitation of an old-fashioned English hostel. There is one point, however, in which this as well as other inns near the Wye differ from the inns of old, and this is in the matter of prices. I don't mean to say they are exorbitant, but I think they might be reduced with advantage to the innkeepers, and certainly with advantage to the photographer.

From the Court we went, after a short rest, to Ross by a path alongside the river, which, though the longest way, I would recommend any of your readers to follow it, as it offers scenes far superior in beauty to the shorter route which you may reach by means of the ferry. The difficulty I experienced here was not in finding good views, for there was hardly a yard which did not offer a temptation to fix the camera. Unfortunately, I was unable to gratify my desire in this respect from the accident I have mentioned. The river here is broad, and winds along in the most picturesque manner. On the left bank are meadows, which present a beautiful contrast to the lofty hill on the opposite bank, on which Goodrich Court is built, and the sides of which are covered with trees. I think I never in my life saw a view which would make a better photograph, especially if one could use the plano-panoramic camera of Garella, respecting which so much was said in Paris some two or three years ago, and which I presume succeeded no better than one which I made myself at considerable cost, and what was worse, loss of time. I don't wish you to understand that I invented the plan of this camera; I simply followed the description given in the Bulletin of the French Photographic Society, and so, I think, made certain improvements in it, but without getting it to work well. Still, I think something may be done in this direction, and as soon as the weather ceases to be favourable to out-door operations, I shall resume my experiments. To return to my trip. The

extreme beauty of the scenery made me regret so much my forgetfulness of the morning, that the pleasure I should otherwise have felt in my walk was considerably diminished, and I reached Ross in a rather discontented mood. Associated with Ross is an individual whose photograph would be viewed with interest wherever our language is read: I need scarcely say I allude to the "Man of Ross." There is hardly an object in the town which is thought worth looking at which is not associated with him in some way or other. In the church, no very striking object in itself, it is the pew in which he sat, his monument with an inscription and his bust; the spire of the church itself, if we may believe the poem, being a more conspicuous monument to his memory than that which bears the inscription. The terrace outside the church, called "the Prospect," was made by him also, and deserves the name much better than the majority of places that bear a similar denomination, for the view from it is both extensive and beautiful. Of his house I took a negative the following morning before leaving, the man having brought my plates up the previous evening. The inhabitants of the place seem thoroughly proud of the man whose good deeds have been immortalised by Pope, and whose reputation has conferred a similar immortality on the place in which he spent his meritorious life.

On leaving Ross, and continuing his way along the river, the photographer will find nothing to induce him to unpack his apparatus for some seven or eight miles; but after we had passed this distance, we came upon a succession of views, which speedily absorbed my stock of plates. Pretty little islets occurred here and there, and a sufficiently shallow spot was soon found in the bed of the river, on which to pitch the camera. There is no comparison in point of beauty, in my opinion, between my negatives taken in this position, with the river flowing along on each side of it, and one taken from the bank, such as I have frequently seen; more especially is this greater beauty observable in the case of the stereoscopic picture which I sent you, with that referred to in my last communication. Besides these views, there are others of a different character. Every now and then, there occurs a break in the trees which line the bank, and you get a lovely view of the hills beyond. So delightful is this part, that you regret your arrival at the end of your day's journey. There is a rough-looking hill, which was pointed out to us by the boatman, which rises quite close to the spot where the river Lug joins the Wye, respecting which Camden says: "Near the confluence of the Lug and the Wye, a hill, which they call Marclay Hill, did, in the year 1575, rouse itself out of sleep, and for three days together, showing its prodigious body with a horrible roaring noise, and overturning everything in its way, raised itself (to the great astonishment of the beholders) to a higher place." Unfortunately, the appearance of this hill was not sufficiently attractive to tempt me to bring away a likeness of it, notwithstanding the strange fact recorded respecting it. The old city of Hereford contains objects which may form interesting pictures on some future occasion; but my stock of negatives had accumulated so largely by the time I reached there, that I only took two of the Cathedral and one of the Town-hall, which exhausted my stock of plates. The remainder of my trip, which did not end at Hereford, I made as a pedestrian, leaving my camera and et ceteras behind me; and though it might be interesting to photographers to know what objects offered themselves for the camera during the rest of my journey, I am warned by the length of my letter not to trespass farther on your space. I should like, however, before concluding, to add a word on the subject of a collodion, the formula for which was published in the "Photographic News" a few months back. The formula I allude to is that of M. Mayall, and being, of course, aware of his reputation as a photographer, I thought a collodion recommended by him in such strong terms, must necessarily be a good one, and at the expense of some inconvenience as well as loss of time, I prepared some, not a large quantity, but sufficient to test its qualities. The result, I am sorry to say, did not answer my expectations; there was a want of vigour and cleanliness in the details of the picture, so that, after failing with half-a-dozen, I threw the remainder of it away. It is possible I may not have prepared the collodion as well as M. Mayall himself would have done it; indeed, my private opinion is, that it is a mistake for amateurs to attempt to make collodion at all, and I merely mention this fact in the hope that it may induce some others who have tried it to publish the result, as I cannot but think, in spite of my own failure, that it *must* be good, or a photographer of M. Mayall's reputation would not have recommended it.—Yours obediently,

R. A. W.

Miscellaneous.

Latest Foreign Art and Science Intelligence.

Indian Photographs.—The brothers Schlagintweit, whose researches in India have been assisted both by the East India Company and the Prussian Government, have been especially successful in galvano-plastic and photographic representations of Indian subjects. Impressions of their photographs will be published in a short time by M. Brockhaus, of Leipsig.

Copenhagen—New Observatory.—Instead of the badly situated old observatory, a new one on the *ramparts* is to be built. It will, however, not be higher than 30 or 40 feet. Professor d'Arrest, its projector, has ordered the instruments from Messrs. Pistor and Merz, at Berlin and Munich respectively.

Humboldt's Epitaph.—A German contemporary prints the following epitaph for the great defunct:—

> "After he had *all* seized and known, what moves in light *here*,
> He now descended to *darkness* as well, for further research."

[This almost literal translation of the *distichon* may convince the reader, that it is difficult to write even an epitaph for a man like the great sage of Berlin.]

Restorations and Frescoes in Germany.—The Cologne painter, M. Welter, has completed the ornamentation of the ancient church of St. Cunigond, in Cologne. He has been now called by the Grand Duke of Saxe-Weimar to Eisenach, for the sake of completely ornamenting the restored castle, called the Wartburg, once the abode of Luther. The work will be entirely according to the designs of M. Welter, and will occupy him two years. The great banquet-hall is nearly completed.

Paris Art Exhibition.—Amongst the prizes awarded this year, M. Keller, of Düsseldorff, has received one of the first class, for his engraving of the *Disputa*. It is a gold medal of more than two inches in diameter, of the weight of one pound, and of the value of 60 sovereigns. Its inscription is characteristic:—"Empire Français, Maison de l'Empereur," &c. On the reverse is a basso-relievo, representing an allegory of the art of the engraver, with the inscription "Recompenses imperiales."

Berlin Geological Society.—At the late meeting, M. Schöchting exhibited some crystals, which were broken by a natural process, and again united by quartz. M. Schöchting further spoke of the existence of fluid and gaseous contents in the interior of crystals (especially quartz crystals), and asserted his belief that in this instance, as well as in granite, he could only recognise plutonic formations. It is known, that Sir Humphrey Davy and Berzelius ascribed to these mineral substances a volcanic (igneous) origin.

Effect of Lightning on Electric Telegraphs.—During the storm of the 8th inst., the telegraphic station of Basle was twice struck by lightning. The explosion resembled the discharge of a pistol, and the flashes passed above the apparatus. On the conductor (*Blitzplatte*), several brass wires were melted, the multiplicator of a *boussole* melted and burnt, smoke issued from the conductor, &c.

Life Recondite—The Wonders of the Microscope.—We copy the following extract from a paper entitled "The First Ages of the World," written by M. Alfred Maury, of the French Institute:—"The microscope has revealed to us infinite numbers of plants and animals, in countries apparently the least favourable to such a development. Near the two poles, where higher organisms could not exist, reigns a life invisible to the naked eye, and which hides itself under the thick cover of the frost. In the remnants of melted ice, which float in the form of

rounded blocks near the Arctic circle, more than fifty species of *Silicious Polygastrics*, and the *Coscinadisca*, have been discovered, the green covering of which show that they have successfully striven against the rigour of a frozen climate. Not only is the ocean tinted in places with colours which it owes to innumerable shells, or to prodigious hosts of plants spread through its waves; but even in places where it seems quite transparent, it is yet filled with all sorts of animal life. The lead has found, even at the depth of 500 metres, animals of the smallest dimensions. The waters of morasses and bogs conceal, as well as the ocean, astounding numbers of molluscs and worms of the most bizarre form; and in the interior of the earth, in those mines which but the blast of gunpowder will open, as well as on the highest points of the Alps and Andes, in thermal springs, and in the snow, cryptogamic plants and infusoria abound. The celebrated physiologist Nordmann, has found that the humors in the eyes of fishes are often filled with a species of worms armed with suckers; and that in the gills of the bait (*able*) there exists an animalcule with two heads and two tails. All the molecules which live on the surface of the earth, have, since the apparition of organic life on the globe, passed a thousand times through some higher organisms, which had appropriated them to their use. And these operations, which pass every day under our eyes, have now lasted for myriads of years."

Photographic Notes and Queries.

DEFECTS IN FOTHERGILL'S PROCESS.

SIR,—In a recent contemporary appeared a letter from "W. C. J.," complaining, under the above head, of a certain evil, for which, as yet, no adequate remedy has been suggested. I am myself (in common, I doubt not, with a legion of Fothergillians) annoyed by precisely the same appearances, and, like "W. C. J.," find them the only bar to complete success. "W. C. J." describes them exactly:—

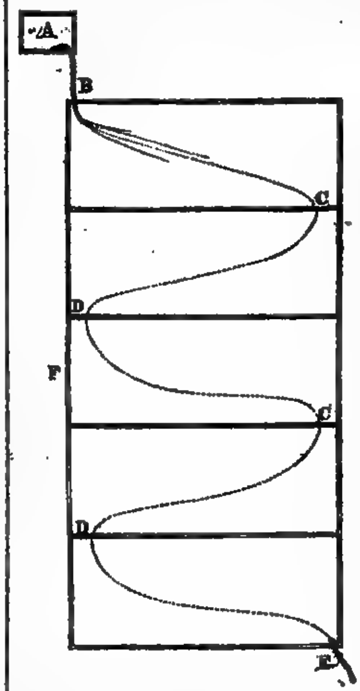
"It is the occurrence, chiefly in the skies, but occasionally in the other parts of the picture, of *striæ*, of all shapes and forms, sometimes very like (on a minute scale) what are called in silks and other fabrics '*water markings;*' at others patches of varying length and breadth, either ending abruptly, or shading off gradually into the proper shade of the film."

It is these zig-zag "water markings" that constitute my own difficulty, and I have, as yet, tried in vain to get rid of them. It is something, however, to have reached a negative knowledge on the subject, and in default of knowing what the evil *is*, to know what it is *not*. It is *not* "owing to the albumen not being evenly applied on the collodion surface," as the editor of the periodical alluded to suggests, nor from "particles of dust, by being put to dry on a dirty shelf." (Poor "W. C. J.," this was "throwing dust in his eyes" with a vengeance!) Again, referring to attempted explanations in the current number of the Journal, it does *not* "occur in the drying of the plates." I have placed scores of plates "vertically" (as if any one would put them horizontally!), with every precaution against impure contact. It is *not*, as Mr. Keene desperately suggests, owing "to the developer not being kept in motion," for the simple and sufficient reason that the stains are on the plate *before the picture is taken*, as is evident on examination of the plate by sufficient light after drying.

That it forms at the time of the contact of the albumen, I have proved beyond a doubt, and that it varies in proportion to the strength of the bath solution on the plate. If I wash in 4 or 6 ounces, and sacrifice sensitiveness, I get rid of it entirely; and on the other hand, by the 4-drachm process, I find it impossible to avoid it. I have tried every conceivable modification of dipping, draining, and drying—every degree of dilution of the albumen, and every imaginable method of pouring it on—baths, acid and neutral—collodions, contractile and non-contractile. I have worked at every degree of temperature, and, in fact, have done everything (except writing to Mr. Hardwich) that I can think of, and all without avail. This skeleton still haunts my dark closet. Can anyone whose eye may fall on these lines, remove it? G. M.

WASHING POSITIVE PRINTS.

SIR,—The effectual washing of positive prints, in the absence of a running stream near at hand, or a good supply of water indoors, has puzzled many tyros, and I daresay professionals too. Your correspondents have, at various times, suggested different plans that are simple enough; but I do not remember seeing one that is easier to accomplish than the one I have lately adopted; and, with your approval, its insertion in your useful journal would doubtless be a favour to a great many. At my house, water is only to be had from a pump in the yard; and I found it such a bore to be continually visiting it to change the water during the process of washing a lot of prints, that I became disgusted at the very name of pump, and really believe that, had its "tail" been wood instead of iron, as it is, I should have broken it or set fire to it in my impatience. Not being a Crœsus, I could not afford to improve my landlord's property at my own expense, by laying down pipes and taps, and therefore began to invent; and, simple as the plan is, I think I must have scratched a "tarnation" lot of hair off my cranium ere my ideas ripened into success. I know one or two newspaper editors who find great relief from a similar process during the labour of thinking. Now for my dodge: Suppose A to be my pump trough, and the escape hole corked up. I fill it with water by pumping; and as it cannot escape, I have a reservoir, with solid stone wall, holding thirty gallons or thereabouts. F is a box four feet long by two feet wide, made of half-inch deal, water-tight at the sides, and three inches deep, and is divided into five compartments, by wood partitions passing from side to side.



At C a hole is bored through the *bottom* of the first partition to allow the water to run into the next one, where it escapes at D over a groove into the next, then under again at C into the fourth, and over at D into the fifth. At the corner E a pipe is inserted through the bottom of the box, and carries the water to a sink in the yard. In each partition I put as many prints as is convenient, and then connect the box at B with the trough A by means of a syphon of gutta percha. I stop up with a cork the pipe E until the compartments are full of water, then pull it out, and behold I have a running stream, in the direction of the dotted lines, that lasts for two or three hours, when I pump the trough full again for a fresh supply. I find it useful to have a lid to the box to keep out the continual shower of soot that falls in my neighbourhood from the factory chimneys. Hence all my prints are free from that vile contamination, which the Smoke Preventive Act has not, and, I believe, cannot lessen. The whole cost of the box, syphon, and escape pipe, was four shillings; the water costs nothing, which is cheap enough for the shallow-

est purse.—Wishing every fellow photographer that dabbles in water, or plays tricks with sunbeams, a successful career, I beg leave to subscribe myself, PETER POSITIVE.

Newcastle.

GUTTA PERCHA DIPPERS.

SIR,—Your correspondent "S. E. C." stated in your last number (page 240) that a gutta percha dipper had been employed which had a piece of iron inserted to strengthen it, and, the gutta percha having a crack in it, the bath was destroyed.

About two months ago, I had observed a bright metallic deposit just above the shank of a gutta percha dipper which I was using, and I was disposed at the time to attribute this to some electrical action which had been set up in some way or other. On the following morning I found the deposit to have occurred in a much greater degree; in fact, there was a firm metallic incrustation around the shank of the dipper, which much resembled the deposit which takes place at the end of the negative pole of a battery in the electrotyping process; and a beautiful deposit of silver, in ramifications, like the branches of a tree, were observable to the extent of about an inch beyond the crystalline mass. On removing, with a penknife, the incrustation which had formed, I discovered something hard, which the knife could not remove; and this turned out to be, as your correspondent remarked, a piece of iron imbedded between the shank and blade of the dipper.

After I had removed the silver—which weighed about a pennyweight, at least—I heated a bar of iron, and, by passing it up and down the fissure from which the iron protruded, no further mischief occurred. I have no doubt that had I allowed the dipper to remain in the bath for a week, the whole bath would have been destroyed by the deposition of silver in the manner stated.

I may mention, also, that there was a good deal of silver deposited in a granular form at the bottom of the bath, which had doubtless fallen from the shank of the dipper.

I would strongly recommend your readers at once to look to their gutta percha dippers, and if there is any evidence of a metallic deposit thereon, to ascertain where the fracture is, and to stop it in the way I have mentioned.

ALEXANDER WATT.

METHOD OF INTENSIFYING NEGATIVES.

SIR,—I have great pleasure in forwarding you particulars of the stereogram I sent you last week. The process of strengthening the positive is a modification of the plan given by Mr. Hardwich, in his "Manual of Photographic Chemistry." I find it very useful for portraits, or anything liable to move.

First.—Make a saturated solution of bichloride of mercury in hydrochloric acid (or 2 ounces of bichloride in 7 drachms of the acid), to this add 18 ounces of distilled water.

Second.—Dissolve 12 or 14 grains of iodide of ammonium in 1 pint of distilled water.

Third.—1 pint of distilled water to 2 ounces of hydrosulphate of ammonia. These solutions should be kept in stoppered bottles.

The positive may be very slightly over-exposed, developed, and fixed in the usual way, and when thoroughly dry, run a strip of varnish round the edges to prevent the film peeling off. Then proceed as follows: first, moisten the surface with a little water, then pour sufficient of the solution No. 1 on the plate to cover it; let it remain a few seconds, keeping it in motion to prevent stains; wash well. Apply No. 2; wash; then No. 3, wash again; if not sufficiently intense, repeat the operation a second or third time, when a dense black will be the result, and it will bear printing in the strongest sunshine. J. S. OVERTON.

PHOTOGRAPHIC PRINTING UPON IVORY.

SIR,—Can any of your correspondents be kind enough to inform me of the best method of printing photographs on ivory? If done simply as paper, the chemicals sink, and the grain becomes very apparent; and if the ivory be albumenised, the ivory surface (so desirable for colouring) is lost.

W. R. R.

ANSWERS TO MINOR QUERIES.

NITRITE OF SILVER IN THE SILVER BATH.—*E. Bray.* The effect you describe, viz., the positive pictures taken with it exhibiting a total absence of half-tone, with intense solarisation of the whites, and irregular blue patches all over the plate, while the sensitiveness of the plate is materially increased, is due to the presence of nitrite of silver in the silver bath. It may be removed by rather strongly acidifying with pure nitric acid, and gently heating. After the solution is quite cool, add solution of pure carbonate of soda until there is a precipitate which will not dissolve on agitation, filter off, and then faintly acidify with acetic or nitric acid, as preferred. The presence of nitrous acid in a suspected bath may be readily ascertained by adding an excess of pure chloride of sodium to a portion of the bath; filtering off, and to the clear filtrate, adding a mixture of very dilute hydrochloric acid, with a weak solution of iodide of potassium and starch bath. In the event of its containing *nitrite*, a blue colour or precipitate will appear, according to the amount of this impurity that may be present.

TO CORRESPONDENTS.

E. S. MORO.—A rigid camera, with a sliding body, will be the best suited for the purposes you require. The size must depend upon the kind of lens used, and the size of the picture to be taken.

SALOP.—1. There is nothing in the description of your process which could possibly account for the enormous time of 1½ minutes being required to take a negative portrait, when a positive can be taken in from 3 to 4 seconds. 2. You will find the process recommended by "Θ" in an early number of the present volume, more successful than the alkaline toning process you at present employ.

J. G. M.—Received with thanks.

A HATER OF SPOTS.—Add 10 drops of glacial acetic acid to each ounce of silver bath (positive paper), and we think you will no more be annoyed with spots.

AMATEUR.—We know of no such process.

CAPTAIN S. S. B.—We are unable to answer your queries on blistering, but will insert the letter in our "Notes and Queries," in the hope that the subject may be taken up by some one who has had more experience in the cause and remedy for this annoyance. We shall be very pleased to receive a further account of your experiments on the different intensities of the light in England and the Isle of Man.

A. ORSAY.—Chloride of platinum is prepared by evaporating to dryness, at a gentle heat, the solution of platinum in nitrohydrochloric acid. Perchloride of iron is prepared by dissolving pure metallic iron in nitrohydrochloric acid, and evaporating to dryness likewise at a gentle heat. Chloride of silver may be reduced to the metallic state by several processes. The details have already appeared in our columns.

A TOURIST IN HEREFORDSHIRE.—1. If you boil the hard water briskly for ten minutes, most of the lime will be precipitated, and may be separated by filtration. 2. We will give a description of such a process in an early number: glycerine will not do. 3. Try the effect of soaking your damaged negative in a very dilute solution of cyanide of potassium (¼ a grain to the ounce). It will remove the spots, but it must be watched closely during the operation, or the half-tints will be likely to suffer. As soon as the action has gone on long enough, wash rapidly in plenty of water.

A SUBSCRIBER.—In a recent number we gave all particulars concerning palladium and its chloride.

H. COOK.—Expose longer, or add one grain of bromide of cadmium to your collodion.

W. L.—If you will forward the pictures to us, you shall have our opinion on [illegible]

E. B.—The bath could not have been sufficiently acid.

SULPHUR.—The cause of the yellowness which attacks the whites of your prints is, that during the fixing and toning a slight decomposition takes place, which gives rise to sulphuration. This may be avoided in the following way:—Do not tone and fix in the same solution, but on removing the prints from the printing frame wash them well in water, and then transfer to the *toning* bath; when toned, fix in *new* hypo., and afterwards thoroughly wash. For the details of the process, see an excellent article by "Θ" at the commencement of the present volume.

L. A. D.—You have made very fair progress in the three months you have been practising photography. The spots and other defects arise from local causes, which we could not point out unless we were to see your method of operating. Experience will soon show you how to avoid them. Albumenised paper always has a great tendency to turn brown in very hot weather.

Communications declined with thanks.—H. A. Y.—Philo Photo.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—A. A. A.—Barley.—Dry Process.—O. W. L.—P. Q.

IN TYPE:—A. G. G.—J. E. G.—Captain R. N.—S. E. G.—Ignoramus.—M. A. Root.—Viator.—E. B.—B. M. Brackenridge.—Artisan Amateur.—H. and J. Walter.—A. F. Stafford.—Thomas Warwick.—Captain S. S. B.—W. L.—D. H.—A. N.—J. C. Browne.—Gwenthlian.—B. C. H.—G. H. W.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 48.—*August 5*, 1859.

THE SOLAR SPECTRUM.

IN the "PHOTOGRAPHIC NEWS" of the 22nd ult. (No. 46, p. 229), appeared an article, by Sir J. F. W. Herschel, upon a subject which the writer has made peculiarly his own. Ever since the first announcement to the scientific world of those wonderful phenomena of light-action, which are now comprehended under the general name of photography, Sir John Herschel's researches on the solar spectrum have been steadily and unremittingly pursued; and photographers and men of science (for the latter term does not always include the former) have been alike benefited by the important truths which he has so plentifully culled from this fertile field of research.

Now, in looking at any natural scene, every one is aware that, however carefully and steadfastly it is examined from one point of view, it is impossible to obtain more than a limited knowledge of the general bearing of the individual parts which form the whole. It requires *two* views, from different points of sight, to be examined simultaneously, for the observer to be able to isolate and examine the individual details, and to arrive at a just appreciation of the subject in its full entirety. And thus it is with one of Nature's truths; however assiduously or conscientiously an experimentalist has investigated the secrets of nature, the facts observed and the phenomena recorded require to be collated with other researches converging towards the same end, to be viewed, as it were, in a mental stereoscope, before the importance of the recorded facts and the strength with which they bear upon associated phenomena can be truly known and reasoned upon.

Sir John Herschel's beautiful investigations on the solar spectrum were, for the most part, given to the world at a time when we were in profound ignorance of even the existence of iodide and bromide of silver, and when our knowledge of the solar spectrum was limited to a few school-boy tricks with a piece of cut glass. It was not until many years afterwards that we were incited, by a perusal of the above-mentioned experiments, to commence some investigations on the subject ourselves, and although we do not even wish to apply to ourselves the saying, that a dwarf on the shoulders of a giant can see farther than the giant, yet the dwarf may, perhaps, from the advantages of his position, discern individual details in such a way as to throw light upon phenomena which would otherwise remain inexplicable; and thus an account of some results which we have recently obtained, and which, at first sight, appear to be in direct contradiction to the effects obtained by Sir J. Herschel, may, perhaps, be read with interest by our readers; as we hope to be able to show that the apparent discordance between the two investigations are only such as are due to a difference in the point of view, and that they really differ only as two stereoscopic views of the same subject—which differ in order to more effectually evolve the truth.

A ray of sunlight may be very well likened to a long rod consisting of parallel wires of different metals, each differing in properties from its neighbour. The bundle, as a whole, may produce certain results, but it will be in vain to inquire which wire or group of wires is the principal agent in any action, whilst they are all mingled together simultaneously. If, however, any force is made to act upon the compound rod, so as to bend it sideways, the parallelism of the wires will be destroyed. The power being uniform, each wire will *give* in proportion to its flexibility; and taking the three metals—iron, copper, and lead—as types of the rest, the iron, being the most able to resist the lateral force, will be least bent out of its original direction; the lead wire will be the one most bent, and intermediate between these two extremes will be the copper wire. The compound rod will thus be decomposed, and its elementary wires being now laid side by side, can be examined and experimented upon, without fear of the results obtained being vitiated by the presence of effects due to adjacent wires.

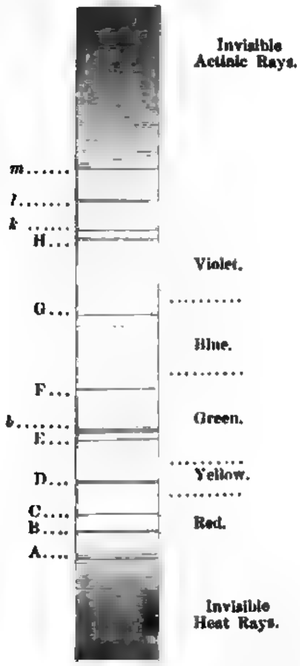
The phenomena of light and the solar spectrum are strictly analogous to the above. A beam of sunlight may be split up into its numberless elementary rays, and these may be presented to the experimental philosopher, each lying side by side and isolated from its companions, by allowing the original beam to pass through a *prism;* an instrument which possesses the property of bending each ray sideways. In this case also, as it was with our wires, each ray is bent (or refracted) in a different degree to its neighbours, and the result is the *solar spectrum*, the red end of which can be likened to the iron wire, the violet end to the lead wire, and the brilliantly-coloured, luminous part, to the copper wire.

Let us pursue the comparison farther. It will be easy to imagine that, if each individual wire of the bundle is of a moderate diameter—and the difference between the deflection of the lead, copper, and iron is extremely small—the wires might *diverge* from the point at which they were bent, but, at the same time, *overlap* each other to such an extent as not to show any blank spaces between them; if, however, their thickness is gradually diminished, a time will come when this overlapping will cease, and each wire will be isolated from its neighbours, and will show a vacant space on each side of it. This simile still holds good in the case of light. If the original beam of light which is deflected by the prism is of any considerable diameter, the component rays will overlap each other, and the resulting spectrum, although good enough for most practical purposes, will not be what is called *pure;* but if the aperture which admits the beam of light be reduced to about the $\frac{1}{100}$th of an inch, or less, in diameter, the elementary rays will present themselves unmingled with each other, and each will be seen separated from its neighbour by a blank, void space.

If a ray of light were strictly comparable to a metallic wire in the above-mentioned properties, nothing more would be required than an aperture of sufficiently small dimensions, and a prism, for obtaining at once this *pure* solar spectrum; but they differ in one important particular. The metallic wire will remain of a uniform thickness, whatever be its length; and, consequently, by regulating the aperture through which it originally passes, we regulate, at the same time, its diameter in every part of its subsequent course. Not so the ray of sunlight: this has the property of increasing in diameter the longer it gets; and, consequently, we must not only regulate its diameter at the commencement, but we must also take steps to counteract this diverging tendency, or else we shall have the separated rays overlapping at the spectrum as much as ever. This may readily be effected by means of a convex lens; and by introducing this into the path of the beam of light, near the prism, we obtain on the screen a *pure* spectrum. The appearance of this spectrum, of course, varies with the aperture originally employed for the ingress of the light. If it were a circular hole, $\frac{1}{100}$th of an inch in diameter, the

spectrum would appear as a line of hardly any breadth. It would, however, be impossible to observe any fine and delicate black lines crossing such a spectrum; and, therefore, the plan is universally adopted of admitting the sunlight through a narrow slit (about 1 inch long by 0·005 inch wide) parallel to the refracting edge of the prism, and the spectrum then becomes a brilliantly-coloured band, about 1 inch broad, and crossed with an immense number of sharp black lines, of all degrees of visibility; the luminous lines being the elementary rays of the sunlight, and the black lines being the intermediate spaces where the rays are wanting. However the spectrum is formed, so long as the light is originally derived from the sun (*i. e.*, whether it be from a white cloud, the moon, or the planets), these individual rays are always bounded by the same black lines; and as these are of the greatest diversity of appearance in different parts of the spectrum, writers on this subject are in the habit of employing certain of the more prominent of these blank spaces as a means of identifying different parts of the spectrum; and, to certain of these, Fraunhofer (one of the first who observed these phenomena) gave the letters A, B, C, D, E, F, G, as a means of more ready identification.

The following diagram will serve to give an idea of the position of a few of the more prominent of the *fixed lines*, with respect to the colours in which they occur:—



At one side of the representation of the spectrum above given are dotted-off spaces, which we have assumed to represent about the space of the spectrum which can be said to be of the colour named. We must explain, however, that these dimensions are only arbitrary; no accurate mapping out of the coloured spaces is possible in the present state of our colour-nomenclature; and we believe that it will be very long, if the time ever comes, before we are able to give a definite name to each of the thousand different tints and hues which blend so marvellously one into the other, and even then no eye could, by any amount of practice, succeed in identifying any one of them by name. It is as if between each key on a piano twenty intermediate notes were introduced, subdividing the interval into as many separate sounds, each rising higher than the preceding one by one-twentieth of the full interval. No ear, however delicately attuned, could ever give more than a guess respecting the position, on the subdivided scale, of a particular note sounded; and when we have to make allowance for the almost untutored state of the eye as to colour, as compared with the exquisite perfection to which the ear has been cultivated, we shall be able to appreciate the immense boon which was conferred on optical science by the discovery of such unchanging landmarks as the fixed lines in the spectrum. We can now look upon the variegated colours of the brilliant band before us as a mere accident, dependent upon physiological causes, with which the student in this branch of science need have no concern; and, considering the spectrum, from the lowest refrangible heat-ray to the highest ray of actinism which has yet been able to struggle through our atmosphere, as but successions of ray-force lying side by side and separated by vacant intervals; we can proceed to examine its properties, and investigate its action upon material bodies, in total disregard of that opacity of the fluids of the eye, or insensitiveness of the retina, which allows us to *see* only a portion of the central part of the spectrum.

(*To be concluded in our next.*)

THE WAXED PAPER PROCESS FOR HOT CLIMATES.

BY MR. W. H. STANLEY CRAWFORD.

[A CORRESPONDENT at Bombay has sent the following description of a process which, he informs us, is practised with great success in that climate, where other processes which had been found to succeed perfectly in England, entirely failed. It is from the pen of one of the secretaries of the Bombay Photographic Society.—ED.]

It is admitted by every unsuccessful "Knight of the black tips"—as a wag has facetiously designated "*one of ours*"—that the various processes recommended by a variety of practitioners in England, present each and all some serious obstacle to the Indian amateur.

An "uncertainty of result" would seem to be the amount of experience acquired by every unlucky wight, who has followed implicitly the "plain directions" of one of these "guides," and this uncertainty has not unfrequently given rise to ungenerous doubts as to whether the author has fairly and conscientiously given the result of his experience, or whether the "instruction," like the "Jew pedlar's razors," is only intended to "sell." Doubts like these vanish when we have the authority of well known names, but the result remains the same, and for the best of all reasons—the instructor never for a moment contemplated an *Indian* pupil when laying down a course of instruction obviously intended for the exclusive benefit of those practising in Europe. Or if he did, we might justly, and without fear of being deemed uncharitable, assume that the *master* would have been as much at a loss how to proceed in his work, as the *man* himself would be in his endeavours—aided solely by an *English* guide—to unravel photographic causes and effects under an *Indian* sky.

It is a recognised principle in photography—and one that should be ever present to the mind's eye of the photographer—that temperature exercises an important influence on all bodies capable of being acted upon by the actinic ray. Any change of temperature, however slight, produces a corresponding effect on these "bodies," and we have no hesitation in stating it to be our belief, that to a neglect of this important principle is mainly to be attributed half the "annoying failures" which so many complain of. An amateur possessed of the requisite knowledge of the principles of organic chemistry, would have little or no difficulty in modifying a "process" so as to render it applicable to India—but of those who have acquired this knowledge, few, we apprehend, have the time or inclination to devote to an analysis of this nature; a process, therefore, like the follow-

ing, which has received the test of local practical experience, is found to be uniform in its action, and by means of it an unlimited number of sheets of paper may be prepared to keep sensitive for a couple of weeks, cannot be regarded otherwise than as a boon to the Indian public.

After numerous and repeated trials of the various known photographic processes on paper, I have arrived at the conclusion that for general utility and certainty of action in the warm climate of India, none can be compared with the waxed paper process. In this particular branch, as in almost every other of the art, varieties of formulæ have been given, each having some peculiarity to recommend it; but of all that I have tried, those of Mr. Townshend and of Mr. How have appeared to me the simplest and the best.

My personal experience leads me to condemn as objectionable the very prevalent practice of putting into the iodising liquid large quantities of organic matter, such as whey, rice water, sugar of milk, gum arabic, isinglass, &c. &c. Paper so prepared, I find particularly liable to attract and absorb damp, especially during the monsoon, whereby it becomes, as a matter of course, charged with impurities, and, consequently, useless. I, as well as many of my friends, have suffered much inconvenience from this cause.

Coming into the field as I do after so many eminent photographers, it is naturally with feelings of much diffidence I put forward the following modification of the waxed paper process, and it is only that I know how different in many respects is the result of operations in a cold climate, to the effects produced in such a climate as that of Bombay, that induces me to give my Indian experience.

To wax paper, I shall give no particular formula, so many excellent modes having already been given, nearly all of which answer equally well here as in a cooler clime. For my own part I prefer purchasing ready waxed paper, thereby saving myself the inconvenience of a troublesome operation. In purchasing wax paper, however, it should be carefully examined sheet by sheet; those free from conspicuous flaws should be selected, and while having the appearance of being thoroughly saturated with wax and quite transparent, they should present no shiny patches on the surface, but a uniform dull smoothness; should shining patches appear on paper in other respects good, the objection may be got rid of by carefully ironing the sheet between folds of clear bibulous paper.

Waxed paper, whether in its plain state or iodised, should always be kept in a portfolio, and in as cool a situation as practicable.

The iodising solution I have found to answer best, is made as follows:—

No. 1. In 20 ounces of distilled water dissolve 480 grains of iodide of potassium.

No. 2. In 10 ounces of distilled water dissolve 96 grains of bromide of potassium, and then add 24 grains of chloride of potassium.

No. 3. In 10 ounces of distilled water dissolve 10 grains of cyanide of potassium.

No. 4. In 4 ounces of alcohol dissolve 5 grains of iodine.

Mix solutions No. 1 and 4 together, agitate well, and then add No. 2 solution to it and agitate well; finally throw in solution No. 3, and agitate well. This solution should be kept in a well-stoppered bottle covered from light, and will be of service till entirely expended.

When required for use, this liquid should be filtered through white clean bibulous paper into a pan of good depth, and as many sheets of paper as are required may be immersed one by one in it; care being taken that no air-bubbles adhere to the paper, either above or below, and that the liquid quite covers the whole mass of paper.

The paper should now be allowed to soak in this solution from 6 to 10 hours, after which it may be taken out sheet by sheet and hung up in a cool place (not exposed to much light) to dry; when dry it should be carefully wrapped in clean paper, and placed in a portfolio till wanted, and, with ordinary precautions, may in this state be preserved good for months.

The exciting solution is made thus:—In 24 ounces of distilled water dissolve 2 ounces of crystallised nitrate of silver; when dissolved, add glacial acetic acid 2½ ounces, and finally add 5½ ounces of alcohol.

Filter before use into a pan larger somewhat than the paper to be excited.

Into this solution immerse one sheet of the iodised paper (taking great care that no bubbles adhere) and allow it to soak for about five minutes, when it should be taken out, and if to be kept for several days, placed in a similar pan containing pure distilled water, rinsed in it for a minute or two, and then dried off between folds of *clean* bibulous paper, where it should be retained ready for use in the camera. As many sheets as are needed may thus be prepared one after the other, and when finished should be kept in a portfolio in a cool place, and most cautiously excluded from light.

To give any accurate time for the exposure necessary in the camera is almost an impossibility, but with a 3 inch view lens, ½ inch opening, and our ordinary Indian light, 5 to 6 minutes would be about the time required by this paper for buildings, but for foliage or dark masses of architecture in shade, 9 to 12 minutes would probably be better.

It may not be out of place here to impress upon the mind of the novice the absolute necessity of the most strict caution not to allow the least ray of daylight to get at the sensitive paper when not under exposure through the lens to a view. Camera slides, no matter how carefully made, cannot thoroughly exclude our bright sunlight, and the only plan to ensure certainty is to wrap several folds of yellow cloth round the slides when not in use. Too much care cannot be bestowed upon these precautions.

Paper made sensitive as above described may be kept, with the precautions advised, at least ten days with perfect confidence. I have worked with such paper 16 or 17 days after excitation, and found no appreciable diminution of effect, even in the time of exposure. It may also be kept several days after exposure in the camera before being developed. At the same time it is always advisable to use the paper as soon after excitation as possible, as involving less chances of failure in excluding mishaps which *might* intervene by the lapse of time. The same remark applies to the development, which in particular should, if practicable, be done within 24 hours after the exposure in the camera.

The developing solution is made by filling a bottle quite full with hot distilled water, and throwing into it as much gallic acid as the water will dissolve; when it will dissolve no more the solution should be allowed to cool and settle—then the clear liquid may be poured into a clean pan—say to the depth of ½ of an inch. Into this the impressioned sheet is immersed and allowed to remain for 5 or 10 minutes. The picture rarely developes rapidly under this solution, there being so little free nitrate of silver left on the paper; it is necessary, therefore, to assist the development by throwing into it an ounce of the water in which the sensitive sheets were washed (which should be preserved in a bottle for this purpose); the picture will now rapidly develop and from this moment the process requires *very careful attention*. In the first place, to check it at the point when all the details of the picture are properly out; and in the next, if the developing liquid should show symptoms of browning (decomposition), which in this climate will speedily occur in gallic acid to which free nitrate of silver has been added, to replace it immediately with fresh; a neglect of this precaution may perhaps destroy what would otherwise have proved a good picture.

The time that the process of development occupies varies so much that none in particular can be stated. However, a picture is seldom out in less than a quarter of an hour, and it *may* be 12 or 20 hours if the exposure in the camera

was too short a time; in the latter case particular care must be taken to renew the gallic acid solution should it show symptoms of becoming brown.

A picture should be allowed to go on developing so long as the whites or half tones do not suffer, that is darken. When all the details appear distinctly visible, the sheet of paper should be held up between the eyes and a light; if the blacks in this position present a density impenetrable to light, the whites a clear transparency, and the half tones a relative value, the operation should be stopped, the picture put into a pan of clean water and brushed on both sides with a soft, broad, camel's hair brush to remove any deposit that may have settled upon it; if allowed to remain thus for about half an hour, nearly all the acid will be washed out; it should then be passed through a fresh pan of water, and, afterwards, to remove the iodide, placed in a bath of cyanide of potassium made as follows:—

Cyanide of potassium	80 grains.
Water	16 ounces.

Filter for use.

This bath is preferable to one of hyposulphite of soda, inasmuch as it acts more quickly, is less bulky, and is safe in operation, for nothing can be more injurious in working than hyposulphite, the least contact of which is destructive to the exciting and iodising baths.

The cyanide bath is *very energetic*, and consequently the picture requires much attention when in it; for, if left beyond the time sufficient to dispel the yellow iodide, it will, in continuing its action, reduce also the blacks—indeed it would, if left for any lengthened time, entirely obliterate the picture.

If a hyposulphite bath is preferred, the following will be found to answer well:—

Hyposulphite of soda	3 ounces.
Water	20 ounces.

Filter.

When the iodide has thoroughly disappeared the picture should be washed for an hour in several changes of water (say four or five times), and in a good supply of water each time, it should afterwards be hung up to dry.

When thoroughly dry, expose to the sunshine for a few minutes, and finally iron with a moderately heated iron; this operation renews the transparency of the paper which in its continued and repeated washing is in general somewhat impaired.

In conclusion, I have only to recapitulate and throw out a few further precautions. Adopt the utmost cleanliness in every stage of the operation. Use no chemicals but what are guaranteed as the best. In exciting, use in the dark room no more light than sufficient to enable work to be done with comfort. Use *fresh clean* bibulous paper for blotting off the paper after exciting. Filtered or otherwise, let all the solutions be perfectly clear and limpid. Use the greatest care in preserving the excited paper from the least ray of light when not under exposure in the camera, and so till the picture is developed. Never use the gallic acid bath after it has browned at all. After fixation in the cyanide bath wash thoroughly in water to remove every trace of that solution. The paper, in every stage—in its plain, iodised, excited, impressed, and completed state—should always be wrapped in clean paper and laid flat in a portfolio, kept in a cool place. In this climate every camera for outdoor work should have a thick yellow quilted cover, which both serves as a protection to the wood, and excludes white light which might gain admission by any barely perceptible flaw, and also assists materially in maintaining a cool atmosphere about the paper. The lens must of course be wiped occasionally; perfect knowledge of the proper use of the various sized diaphragms can only be acquired by experience and practice, but, as a general rule, the smallest sizes, compatible with the amount of light available, should be used.

FALL OF AN IMMENSE AEROLITE—PARAMOUNT IMPORTANCE OF PHOTOGRAPHY.

"A FEW weeks ago the inhabitants of the towns of Boylston and Redfield, in Oswego County, New York, United States, were startled by the occurrence of a remarkable phenomenon—the descent from the heavens of an immense meteoric mass. The body struck the earth, between the hours of three and four in the morning, with a crash that was truly terrific, and the shock was sensibly felt, and people aroused from their slumbers, at a distance of five miles from the scene. The body fell upon the farm of Horace Tanger, situated on the line of Boylston and Redfield, striking in a meadow, and partially on the highway. It is estimated, by our informant, to cover half an acre of land. The earth was torn up in a terrible manner, and large fragments were thrown a distance of two-thirds of a mile. The mass is very irregular in shape, and rises at some points to sixty and eighty feet in height, and is supposed to be imbedded in the earth as many feet. The surface generally has the appearance of iron ore. The excitement occasioned by the event among the inhabitants was intense, and the crash is said to have been terrific beyond description. Many supposed that the final winding up of terrestrial affairs had arrived."—*Oswego Palladium.*

We consider the above occurrence, so fully stated by our American cotemporary, as most extraordinary. Although the words "*lapidibus pluisse*"—"it rained stones"—occur several times in Livy, yet we do not know of any case where such an immense mass of a meteoric stone was ever projected in times historical. It will surely be an object of much research, and of interesting photographic delineation —*mineralogical* heliography being one of the next steps of that Art, of which it also may be said—

"Eripuit lumen Soli . . . ."

Of meteoric stones, of an ante-historical origin, there are some huge ones lying in Siberia, examined by Pallas; and there is some large meteoric copper near Bahia, in the Brazils, in India, &c. But on comparing the forms of those aerolites (even those in the British Museum), the thought obtrudes itself, whether those huge gold nuggets of Australia might not be as well projections of the atmosphere, as it is difficult to conceive how masses of gold, of some thousands of ounces weight, could have yielded to any terrestrial (volcanic) heat, &c. The photographic reproduction of similarly interesting nuggets through the camera will be of much interest, as they soon pass away in the assayer's crucible.

As far as relates to the huge mass of Boylston and Redfield, it would have been an object of great importance to have had it photographed soon after its descent; because, as such meteoric metals descend mostly in a very high state of temperature—molten internally, &c.—the first sight thereof might have conveyed interesting information. It is such important phenomena which will spread photography over the whole world, as in numerous, nay, most cases, there is no draughtsman within reach capable of seizing such objects, so as to make his work useful to the geologist.

As the subject of mineralogical or geological photography has hardly yet been touched, it may not be out of place to throw out a few hints to persons who intend to take up the matter. To begin first with large faces of rocks, gulleys, crevices, earth slips, *éboulements*, &c., it will require some preparatory study to select such as are of greater interest—the cropping out, and the stratification of, various geological formations, so-called *faults*, &c. Still, a little study and a little experience will soon impart to the photographic traveller the necessary tact of selecting, at least, not quite worthless aspects. But even large views of entire mountain ranges, if not taken at too great a distance, will, especially in *new* countries, be of importance; because geology has arrived at that point, that the very sight of a mountain range will tell the traveller to what *formation* it belongs—primary or secondary, granite or limestone, porphyry, volcanic formation, &c. There is great pleasure in thus reading

Nature's great works at *sight*, and it must be an equally great pleasure for the photographer to seize these vast nature-scenes—sights the grandest we ever can behold.

But even the representation of single *specimens* of minerals, from that huge one covering the area of *half an acre*, to smaller ones that cannot be brought away, is of great importance. Even in the most remote mines of the world, there are collections of specimens, made by the officers, which they will not part with, the easy and accurate reproduction of which, by *moving a slide*, is desirable. If huge masses of single rocks are to be delineated, the old rule of choosing the best and most interesting stand-point is to be observed. At times, as a matter of course, more than one view will be desirable; but after this has been done, recourse must be had to the *sledge-hammer*, a very useful assistant to the travelling mineralogist and mineralogical photographer. Wherever practicable, large corners of the rock, which has been previously examined and depicted, are to be hewn off, and these new faces (fractures) introduced in the camera.

For the sake of showing what remains yet to be done, exclusive of those numberless Swiss sceneries hitherto represented, we may state, that only forty-eight hours' rail from London, there are the giants' mountains (*Das Riesengebürge*)—not properly Alps—still containing some of the softest and finest mountain, meadow, and glen scenery; which, if rendered in large plates, would present, perhaps, the most idyllic scenery in Europe. Not far off thence is the *Adersbacher Felsen*—huge masses of sandstone, stuck column-like in the soil, and forming a natural Stonehenge. In the vicinity lies a fossil forest of some millions of antediluvian trees (*Liriodendrum*), which, to the judicious artist, would yield great and ample scope; and thus we may be permitted, traveller-like, to conclude with a passage of the Koran:—"God's is the Orient, and God's is the Occident—all full of His glory."

SUBSTITUTION OF OXYPHENIC ACID FOR PYROGALLIC ACID.

Mr. R. Wagner recently proposed to replace in photography the pyrogallic acid by an acid possessing similar properties, and the preparation of which might doubtless be undertaken more economically than that of the former. This acid, which may be prepared by various methods, is oxyphenic acid, the composition of which is $C_{12}\ H_6\ O_4$. The following instructions may serve as a starting point for researches, which would be doubtless both very interesting and very useful:—Pyrogallic acid being one of the most precious agents used in photography, but also one of the most costly, it would therefore be of importance to discover a substitute. The presence of oxyphenic acid in crude pyroligneous acid, should chiefly attract the attention of manufacturers of chemical productions. The process recommended by M. Buchner in order to extract it is, moreover, economical. It therefore only remains to determine the quantity contained in the crude pyroligneous acid, and to arrange the work in such a manner that no portion of this quantity should be lost.

Oxyphenic acid, $C_{12}\ H_6\ O_4$, identical with pyrocatechin and pyromorintannic acid, possesses properties very similar to those of pyrogallic acid. It is very soluble in water and alcohol, pretty soluble in ether. It crystallises in colourless rectangular prisms; the crystals, dried at 80° cent., fuse at 110° to 115°. The fused matter boils at 240° to 245°. The vapour is colourless, and condenses into a liquid, which, when cooled, forms beautiful crystals. The aqueous solution presents a re-action scarcely acid, and possesses a slightly better flavour. It easily reduces salts of silver and the chlorures of gold and platinum. Upon rendering it alkaline by means of a little potash or of caustic ammonia, it rapidly absorbs oxygen—becoming green (and not red, which distinguishes it from pyrogallic acid), then brown, and, finally, black and opaque.

It does not change the proto-salts of iron, but yields, in conjunction with perchloride of iron, a deep green colour, which, upon the addition of an alkali, changes to red, and again becomes green by saturating the alkali with an acid. Such are the reducing properties of oxyphenic acid, which have led to its suggested employment in photography instead of pyrogallic acid.

Oxyphenic acid is obtained by the dry distillation of catechu, of morintannic acid, from tin, from copper, from Peruvian bark, from kino, from the roots of krameria triandra, of tomentilla erecta, polygonum, bistorta, &c., and, in general, from the roots of all plants containing a tannin, which has the property of turning green the salts of iron. Pettenkofer has shown its existence in crude wood vinegar.

M. Buchner points out the following process for obtaining oxyphenic acid by means of the crude wood vinegar, or of pyroligneous acid, which may contain about two per cent. by weight:—

Pyroligneous acid is distilled (an operation generally performed in the factories producing this acid, and the pyrolignites of lead or of iron), and the siropy residue is shaken up with a concentrated solution of common salt. The latter dissolves but very few pitchy matters, but takes possession of the oxyphenic acid. The liquid, separated from the pitch, is agitated, in its turn, with an equal quantity of commercial ether; this latter dissolves the oxyphenic acid. The etherial solution, which also contains acetic acid and tarry oils, is decanted, and then distilled. When nearly all the ether is volatilised, the temperature is raised, and, at the same time, a current of carbonic acid is passed through the retort. There first distils the acetic acid, then the oxyphenic acid or pyrocatechin, and, lastly, a thick brown oil. The middle portion becomes, on cooling, a crystalline *magma*, which is expressed, and again sublimed in a current of carbonic acid, if it is required to obtain colourless crystals. These have the composition, $C_{12}\ H_6\ O_4$, and are oxyphenic acid. It has not been possible to detect the presence of this body in the pitch or tar of pit coal.

It is probable that a rather concentrated solution of chloride of calcium (such as is obtained in operating upon the residues of the preparation of chlorine by means of hydrated caustic lime) may be substituted for the solution of marine salt, and sulphide of carbon instead of ether. This slight modification of the process of preparation would, perhaps, cause the pyrocatechin or oxyphenic acid to be obtained at prices considerably below that of pyrogallic acid.

DETERMINATION OF THE DIURNAL AMOUNT OF LIGHT BY THE PRECIPITATION OF GOLD.

BY PROFESSOR JOHN C. DRAPER, M.D.

Plants depending to a great extent on the amount of light received from their growth and nutrition, it is very desirable that we should have means for the measurement of quantities of light, such as those we have for measuring heat. Those, too, who are engaged in photographic pursuits, must have often desired to measure the amount of light of one day compared with that of another; or of one portion of time compared with that of another portion. I shall not, therefore, need any excuse for introducing to your notice a process for the "Determination of the Diurnal Amount of Light."

Various attempts have been made to construct a photometer which would accomplish such a result; and among the substances that undergo change under the influence of light, and which might serve the above purpose, is the peroxalate of iron, first suggested by Professor John W. Draper, in the *Philosophical Magazine* for 1857.

On being exposed to light, peroxalate of iron gives off carbonic acid gas with effervescence, and gains the power of precipitating metallic gold from a solution of perchloride of gold—the quantity of gold precipitated depending on the

amount of light to which the sensitive solution has been exposed.

The difficulty attending the use of this method is, that when the decomposition has fairly set in, the solution becomes turbid, owing to the precipitation of protoxalate of iron; this may, however, be remedied, by adding to the peroxalate a little perchloride of iron, which mixture of peroxalate and perchloride may be exposed for a considerable time to the action of light without any turbidity arising; and, on the addition of perchloride of gold, gives a precipitate of metallic gold. All that then remains is to weigh the gold precipitated, and we have represented the amount of light.

Preparation of the Sensitive Solution. — A measured amount of oxalic acid is boiled to saturation with freshly-precipitated peroxide of iron. The resulting peroxalate is filtered—the filtrate being received in a test-tube containing a little perchloride of iron—and the contents of the filter washed until the mixture in the test-tube amounts to ten cubic centimètres—the quantity used.

In the following experiments, the above sensitive solution was exposed to a north light, or rather to the region about the pole, in a tube of thin glass, $\frac{15}{100}$th of an inch in diameter, which was placed in a box, darkened in the interior, so as to absorb all stray rays. Such an arrangement served to measure the quantity of light for half a hot summer's day; a similar solution, in a similar tube, being substituted at mid-day.

As soon as the period of exposure ceased, perchloride of gold was added to the contents of the exposure tube as long as it caused a precipitate. This precipitate was then collected on a filter, washed, dried, ignited, and weighed. The result indicated the comparative amount of light in the diffuse light of the period of exposure.

As examples, I cite the following experiments:—

No. 1.—September 7th, 1858. Perfectly clear; temp., 76°; dew point, 66°; barometer, 29° 68′; gold precipitated, 56 milligrammes.

No. 2.—November 4th, 1858. Very dark and raining; temp., 47°; dew point, 46°; barometer, 29° 60′; gold precipitated, 7 milligrammes.

These experiments serve to show the capabilities of the process, and may, perhaps, recommend a trial of its merits to such as are interested in photometric pursuits.

A VISIT TO A PHOTOGRAPHIC PAPER ESTABLISHMENT.

We have just returned from a visit to a photographic paper establishment, which may with good reason be termed the most important in existence,—we allude to that of M. Marion, at Courbevoie. We had long desired to make this visit, when chance, without any effort of the will on our own part, led us so near the factory that we decided on availing ourselves of the opportunity to inspect the arrangements of the establishment which turns out such an amazing quantity of photographic paper, ready prepared and otherwise.

In the midst of a whole tribe of work-people of both sexes and every age, we distinguished M. Marion, who, while engaged in manual operations like a simple journeyman, kept his eye on everything that was passing around him. Guided by him we were enabled to follow all the operations in succession which the paper underwent in the hands of the several persons through whom it passed.

The woman who applied the albumen (for in this as in most other large establishments of a similar kind, they employ a woman for this duty) was placed between two apprentices, the first of whom handed her one of the sheets of paper received from the foreman, and which she placed in three or four basins consecutively, according to the degree of perfection it is intended that it shall undergo, after which these sheets are fixed by the second apprentice on little wooden triangles, which are themselves supported on a larger one which traverses the whole length of the workroom. When they are thoroughly dry, they are removed by two workmen, who finish them previous to packing up in reams. This is all accomplished with automaton-like precision and regularity, and without the loss of a second.

Some idea of the development which photography has undergone both in France and abroad, may be formed by the enormous quantity of prepared paper sent out from this factory, almost enough to make one believe that all the inhabitants of Europe are engaged in its practice. We saw a vast case filled with it and addressed to one of our artists following the march of our army, and we looked with a respectful eye on the unsullied sheets destined to become the irrefutable pages of a glorious history. . . . .—*La Lumière.*

Dictionary of Photography.

Fluorescence (*continued*). — "Sir David Brewster had several years before discovered a remarkable phenomenon in an alcoholic solution of the green colouring matter of leaves, or, as it is called by chemists, chlorophyll. This fluid, when of moderate strength and viewed across a moderate thickness, is of a fine emerald green colour; but Sir David Brewster found that when a bright pencil of rays, formed by condensing the sun's light by a lens, was admitted into the fluid, the path of the rays was marked by a *bright beam* of a *blood red colour*.* This singular phenomenon he has designated *internal dispersion.* He supposed it to be due to suspended particles which reflected a red light, and conceived that it might be imitated by a fluid holding in suspension an excessively fine coloured precipitate. A similar phenomenon was observed by him in a great many other solutions, and in some solids; and in a paper read before the Royal Society of Edinburgh, in 1846, he has entered fully into the subject.† In consequence of Sir John Herschel's papers, which had just appeared, he was led to examine a solution of sulphate of quinine; and he concluded from his observations that the 'epipolic' dispersion of light exhibited by this fluid was only a particular instance of internal dispersion, distinguished by the extraordinary rapidity with which the rays capable of dispersion were dispersed.

"The lecturer stated, that, having had his attention called some time ago to Sir John Herschel's papers, he had no sooner repeated some of the experiments than he felt an extreme interest in the phenomenon. The reality of the epipolic analysis of light was at once evident from the experiments; and he felt confident that certain theoretical views respecting the nature of light had only to be followed fearlessly into their legitimate consequences, in order to explain the real nature of epipolised light.

"The exhibition of a richly-coloured beam of light in a perfectly clear fluid, when the observation is conducted in the manner of Sir David Brewster, seemed to point to the dispersions exhibited by the solutions of quinine and chlorophyll as one and the same phenomenon. The latter fluid, as has been already stated, disperses light of a blood-red colour. When the transmitted light is subjected to prismatic analysis, there is found a remarkably intense band of absorption in the red, besides certain other absorption bands, of less intensity, in other parts of the spectrum. Nothing at first seemed more likely than that, in consequence of some action of the ultimate molecules of the medium, the incident rays belonging to the absorption band in the red, withdrawn, as they certainly were, from the incident beam, were given out in all directions, instead of being absorbed in the manner usual in coloured media. It might be supposed that the incident vibrations of the luminiferous ether generated synchronous vibrations in the ultimate molecules, and were thereby exhausted, and that the molecules in turn became centres of disturbance to the ether. The general analogy between the phenomena exhibited by the solutions of chlorophyll and of quinine would lead to the expectation of absorption bands in the light transmitted by the latter. If these bands were but narrow, the light belonging to them might not be

* Edinburgh Phil. Trans. vol. xii. p. 542.
† Vol. xvi. part 2, and Phil. Mag. June, 1848.

missed in the transmitted beam, unless it were specially looked for; and the beam might be thus 'epipolised,' without, to ordinary inspection, being changed in its properties in any other respect. But on subjecting the light to prismatic analysis, first with the naked eye, and then with a magnifying power, no absorption bands were perceived.

"A little further reflection shewed that even the supposition of the existence of these bands would not alone account for the phenomenon. For the rays producing the dispersed light (if we confine our attention to the thin stratum in which the main part of the dispersion takes place,) are exhausted by the time the incident light has traversed a stratum the fiftieth of an inch thick, or thereabouts, whereas the dispersed rays traverse the fluid with perfect freedom. This indicates *a difference of nature* between the blue-producing rays and the blue rays produced. Now, as the lecturer stated, he felt very great confidence in the principle that the nature of light is completely defined by specifying its refrangibility and its state as to polarization. The difference of nature, then, indicated by the phenomenon, must be referred to a difference in one or other of these two respects. At first he took for granted that there could be no change of refrangibility. The refrangibility of light had hitherto been regarded as an attribute absolutely invariable.* To suppose that it had changed would, on the undulatory theory, be equivalent to supposing that periodic vibrations of one period could give rise to periodic vibrations of a different period—a supposition presenting no small mechanical difficulty. But the hypotheses which he was *obliged* to form on adopting the other alternative, namely, that the difference of nature had to do with the state of polarization, were so artificial as to constitute a theory which appeared utterly extravagant.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

A DIPPER for the nitrate of silver bath is easily formed of gutta percha. A good deal of difference of opinion has been expressed as to the best material for dippers; personally, we prefer those of porcelain. But where dippers of a material liable to break are used, it is generally desirable to possess a supplementary one, or ready means of making one; for this purpose, if not for general use, gutta percha will be found useful. The usual form of a gutta percha dipper, and the one most easily made, consists of a strip of gutta percha of the requisite length, about an inch and a half broad, and about a quarter of an inch thick, with one end turned up to form a rest for the plate, something like the subjoined engraving. A dipper of this shape possesses, however, two or three disadvantages. The first objection is one that applies equally to glass dippers, if formed the same way,—that is, by turning up the end—namely, the lodgment that is afforded for a small quantity of nitrate of silver in the groove formed by the bent end of the dipper. The collodionised plate when placed on the dipper, at once rests in a small well of the solution, and a stain along the top of the picture is the general result. We have pointed out this as the source of evil in several instances, where we have been asked to assist in discovering an apparently inexplicable cause of constantly recurring stains. Another disadvantage of these dippers is their want of firmness and rigidity. In lifting the plate out of the bath they are apt to bend backward, and thus risk throwing the plate against the front of the bath, to the damage of the film. To those whose experience has taught them to distrust the action of gutta percha on the bath solution, there is in this form of dipper quite sufficient surface of gutta percha to prove an objection.

All these disadvantages are, however, obviated in the dipper we shall next describe. We refer to the form first recommended, we believe, by Mr. Lake Price, who suggests the use of pure silver wire for the material. This material, whilst costly, is unnecessary, as all the advantages may be secured without the cost, by using common wire coated with gutta percha. The advantages are lightness, simplicity, and efficiency. Its lightness removes the risk of breaking a glass bath by jarring roughly against the bottom—a circumstance which does sometimes happen in using a dipper of heavy plate glass. It is easily made, the bending of the wire and covering with gutta percha requiring no especial manipulatory skill. It answers the purpose well, the plate neither slipping off, nor adhering obstinately by capillary attraction, as in glass dippers; no rest is afforded to the solution so as to cause stains; and the small surface of gutta percha presented to the action of the bath, removes the objection arising from its supposed injurious tendency.* The annexed engraving gives the form of the dipper in question. A piece of wire, either iron or brass, copper being too soft and pliable, having been procured of the proper strength and thickness—that being regulated, of course, by the size of the intended dipper—will be easily bent to the desired shape. It should be joined at the top, either by soldering, riveting, twisting the ends together, or wrapping with a piece of finer wire, as may be most convenient to the manipulator. The stay across the middle is to give strength and firmness, and need only be used in large dippers. This done, it may be coated with gutta percha in several ways, when that material is rendered plastic; but the simplest, neatest, and most efficient, will be as follows: procure some of the very thinnest sheet, the satin tissue will answer best, and cut into strips about half an inch broad; now heat the wire gently, not making it too hot, in the flame of a spirit lamp; then proceed to wrap the strips of gutta percha round the wire in a spiral direction till the whole is covered. This done, pass the whole quickly through the flame of the spirit lamp, heating it just sufficiently to make the overwrapping edges tacky, and, wetting the fingers to prevent them sticking, ply the edges gently together until the whole is joined. This wrapping may again be repeated two or three times, the edges again being joined by the flame in the same manner. Before applying each successive wrapping, it will be well to rub the surface with a little benzol to remove all greasiness resulting from fingering, otherwise there will be danger of the second wrapping not adhering to the first. By this means a neat and perfect coating, completely insulating the wire, may be obtained. Care, of course, should be taken that no spot be left uncovered or unjoined; or injurious action on the bath would be the result.

Where the very thin sheet is not easily procurable, the best plan would be to take a piece of any shape to be most readily obtained, and rendering it plastic or ductile by heating in hot water, pull it out into long, thin ribbons, and then use it in the manner we have described.

These dippers, after coating with gutta percha, may, if it be considered desirable, be further protected from the action of the silver solution by varnishing with shell-lac, as we have described in a former article.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 1st August, 1859.

THERE is at the present moment a great scarcity of photographic news here. The Paris journals are full of extracts from English papers, and give no original news whatever.

* It is true that the phenomenon of phosphorescence is in a certain sense an exception; but the effect is in this case a work of time, which seems at once to remove it from all the ordinary phenomena of light, which, as far as sense can judge, take place instantaneously. It is true that there now appears a close analogy in many respects between true internal dispersion and phosphorescence. But while the nature of epipolized light remained yet unexplained, there was nothing in the former phenomenon to point to the latter.

* Before finally quitting the subject of gutta percha, we shall probably give a brief *resumé* of the communications we have received regarding its injurious action on photographic chemicals, with some comments on the evidence afforded by our correspondents.

La Lumière has actually reproduced a note published by M. Schoenbein in 1847! This note, however, although old to the chemical world, may not be so to photography. The latter is making rapid progress, as may be witnessed in the Great Exhibition at the *Palais de l'Industrie*, and every chemical fact relating to the photogenic action of light becomes of more importance every day. On this account I think it may be interesting to reproduce M. Schoenbein's little note here, for when the latter was formerly published photography was far indeed from occupying the high position it does at the present day.

M. Schoenbein observed, then, that a solution of ferrocyanide of potassium, preserved in the dark, retained its transparency and underwent no change of colour, however long it was kept shut up in complete darkness; but as soon as this solution was exposed to the sun its colour was seen to become darker, and hydrocyanic acid was disengaged, or, at least, an unmistakable smell of prussic acid was given out, whereas the solution of ferrocyanide of potassium has no odour when recently prepared. At the same time, a precipitate of peroxide of iron is formed, and when this has been deposited and the liquid has lost its odour of hydrocyanic acid, the latter is found to have an alkaline reaction.

This curious decomposition takes place more rapidly if pieces of linen or cotton be steeped in the solution and then exposed to the sun; and M. Schoenbein has assured himself that a clear, transparent solution of ferricyanide is decomposed in the same manner as the ferrocyanide.

It is curious to observe the relative number of the various processes employed by photographers, who have exhibited proofs at the Great Exhibition of the Photographic Society, at the *Palais de l'Industrie*. We have the following:—

Damp collodion (Archer)	700	specimens.
Dry collodion	26	"
Taupenot's method	55	"
Collodion and albumen (divers methods)	10	"
Collodion and honey	4	"
Dry collodionised paper	9	"
Waxed paper (Talbot)	209	"
Waxed linen	17	"
Waxed turpentine paper	1	"
Paper wet and dry	43	"
Albumen (Nièpce)	8	"
Total	1,073	"

But, as a great number of the exhibitors have not made known their processes, this figure will not convey any idea of the number of proofs contained in the exhibition.

The process on turpentined paper, which has only one representative in the whole exhibition, is by a M. Bonnefond; the proof represents a view of the Quarries of St. Denis, but I have not seen it, nor do I know anything of the process, except that M. Bonnefond calls it *Papier-térébenthino-ciré-ioduré*, a sort of *multum in parvo* definition, and a word that will not find its way into any dictionary until photography has made still further progress!

Mercury has played an important part in photographic art, and is still considerably employed. M. Ulex has made known a process by which this metal may be purified. It consists in adding to it a concentrated dissolution of perchloride of iron, and shaking the mixture. One part of perchloride is employed for 16 parts of mercury. The liquid mixture separates, when allowed to repose, into two parts, one consisting of the purified metal, the other forms a greyish mass, which, when treated with hydrochloric acid, causes the separation of more pure mercury. In this operation it often happens that a small quantity of calomel is formed; this may be separated and decomposed. This process is not new; it was first proposed, many years ago, by M. Dumas, who showed that chloride of copper acted in the same way as the perchloride of iron. If the mercury contain silver and gold, this method of purification will not separate them, and I think that when pure mercury is desirable, it would be far better to submit the impure metal to the old process of distillation, or to press it through some fine chamois leather, than to act upon it incompletely by dissolution of iron or copper, after which treatment it must be well washed to get rid of the metallic solutions.

A new salt has been formed by an Italian chemist, M. Passerini, who denominates it *pyrophosphate of bismuth*, and ascribes to it the formula—$2\,Bi_2O_3PO_5$, though he brings forward no analysis to prove his assertions. However that may be, the salt in question is prepared by double decomposition: an acid solution of crystallised nitrate of bismuth (4 parts of nitrate to 48 of water), is precipitated by a solution of pyrophosphate of soda. A voluminous white precipitate is formed, which is well washed and dried.

When dry, this new salt forms a white amorphous powder, without smell and almost without taste; the air has no action upon it; it is insoluble in water, alcohol, and acetic acid; soluble in warm hydrochloric and azotic acids; decomposed by sulphuric acid. It is insoluble in pyrophosphate of soda and in citrate of ammonia.

M. Victor Legrip, a pharmacien at Chambon (Creuse), relates a curious observation, which appears to show that sulphuric acid may be formed in the air during a storm.

On the 4th of June last, at 2 o'clock in the afternoon, a storm broke over Chambon. Hailstones accompanied the heavy rain. M. Legrip remarked that the wainscot of his pharmacie, which had been newly varnished with linseed oil, containing oxide of lead, presented a great number of white spots; apparently, the number of these spots coincided with that of the hailstones which had struck against the wainscot. On each spot was a drop of white, milky liquid. A certain quantity of these drops were collected by means of a piece of clean muslin and distilled water. It was not difficult to prove that the white matter the liquid held in suspension was *sulphate of lead*.

M. Chevreul has lately shown the existence of *oxalate of lime* in the greasy impurities that are washed from the wool of the sheep and the alpaca. In seeking a means of obtaining pure oxalic acid from these matters, in order to put the question out of all possible doubt, he discovered a very pretty reaction, namely, that of nitrate of silver on oxalate of lime. One part of oxalate of lime dried at 40° (centigrade), and containing 2 atoms of water and 2·07 parts of fused nitrate of silver, dissolved in 20 parts of water, are maintained from one to three hours, at a temperature approaching 100° (centigrade). In this manner many grammes of oxalate of lime may be completely decomposed. The insoluble oxalate of silver thus formed is well washed and then touched with a few drops of hydrochloric acid, it is immediately transformed into chloride of silver and pure oxalic acid, which may be crystallised from the liquid after the separation of the chloride of silver.

The Russian University of Kharkow, in Ukrainia, has just come into possession of an *enormous electric battery*, perhaps the largest ever known; it is composed of 1,000 Bunsen's elements; and, in a letter addressed to the Paris Academy of Sciences, the professors of the Russian University inform the French *savants* that they intend, from the 1st to the 10th of September next, to execute numerous experiments with this great battery, principally with the view of elucidating certain questions which have been subject to controversy. The Russian professors hope that the members of the Academy of Sciences will help them in their undertaking by proposing any experiments which they may think important to science at the present moment.

M. Naudin, a distinguished French botanist, has just written an extensive monography on the *plants of the melon tribe*. The author describes 21 distinct species of melon, many of which give rise, by crossing, to numerous varieties. This work forms part of a still more extensive one, in which M. Naudin proposes to discuss thoroughly the interesting question of the real origin of our cultivated vegetables. Though I have not the pleasure of knowing M. Naudin personally, I think it would be difficult to find a naturalist more fitted to work out so difficult and so interesting a question.

On a proposition, made by the Belgian Minister of the Interior, M. Rogier, the Chambers have adopted the following measures, which render a noble homage to science and to my much-esteemed and much-regretted friend, the late Professor Dumont, of Liège:—

1st. To accord to Madame Dumont, independently of the modest pension which she receives as the widow of a professor, an annuity of 2,000 francs, reversible entirely upon her three children until the youngest attains his majority.

2nd. To open an extraordinary credit of 25,000 francs, in order that the government may acquire the mineralogical collections, the notes, manuscripts, and geological maps, left by M. Dumont.

THE MANUFACTURE OF COLLODION.

To the Editor of "The Photographic News."

Sir,—When a man communicates information which is of so simple a character as to have rendered it impossible that it should not have been observed by everybody interested in the subject to which it refers, he is usually considered to be engaged in a task of which we all know the popular description. This would apply to Mr. Watt's communication, published in the "Photographic News" of last week, which not only contains superfluous advice, but is in many respects erroneous. In the first place, it is incorrect to suppose that a superior ether, for our purpose, could be prepared by getting samples from different houses and mixing them together. What would constitute the superiority of the substance so prepared? I presume Mr. Watt thinks that different samples of ether have different qualities, and that by mixing them together an ether is obtained which possesses a combination of all those qualities. Now, the nature of ether is always the same, and though there may be differences in the strength of one sample and another, we are perfectly aware of the strength of each, and use that which experience teaches us to be the best suited for our purpose, and not the vague substance which he advises us to employ.

With respect to pyroxiline, can anybody suppose that we manufacture only just sufficient at a time to make one batch (whatever quantity that may be) of collodion, and that pyroxiline made at different times is kept carefully separate? Why, it would have occurred to everybody, I should imagine, that we prepare pyroxiline on the same principle as every other manufacturer prepares the staple of his manufacture; that is to say, we keep a stock of it to be drawn upon as circumstances may require.

The same observations which applied to the ether will apply also to the remarks respecting the alcohol. I obtain all of this substance I require from a wholesale dealer, who furnishes it to me of a specified strength, but I do not trust to him to do my business, but subject it myself to rigorous purification, so as to get precisely what I want; a much more satisfactory method, I take it, than adopting the suggestion of mixing a lot of samples together anyhow. As to the precautions he advises us to take with respect to the iodising solution, I can assure him that it is superfluous. We are perfectly alive to the importance of adding a certain amount of iodide to the collodion; indeed, I am surprised that it did not occur to him that to advise us on such an essential part of our business, was very much the same thing as telling a brewer that it is necessary to add a certain amount of malt to the water to make good beer. As to his having had to complain to a manufacturer that he had found a considerable deposit of crystals in his collodion, I can only say, that in all my experience I never had such a complaint made to me; indeed, it would be impossible, as I—and I have no doubt every other manufacturer does the same—never send out an article until its working qualities have been carefully tested.

I have no desire to impugn the accuracy of Mr. Watt's statements; but I cannot help looking upon his assertion that he has used negative collodion made by seven different makers, and that the collodion he has obtained from the same house on five or six occasions differed so much one from the other as to possess entirely different characters, as being very extraordinary.

As to the relative thickness or thinness of collodion made by different manufacturers, that is a matter for photographers; they have the power of choosing that which they prefer, and if they found it advantageous to mix two collodions together—a practice I should not myself recommend—I have no doubt they would do so without requiring advice on such a simple expedient. As to one manufacturer's collodion giving too much half-tone, and another's giving too little, I will simply say, that to assume this to be the rule is hardly correct; what we each aim at is to produce a perfect article, and though we may adopt slightly different methods of attaining this end, the result is substantially the same; it is therefore quite unnecessary that any of your readers should give themselves the trouble to go to half-a-dozen different makers for the purpose of getting samples to mix together.

I am, Sir,

A Manufacturer of Collodion.

PHO-TOPOGRAPHY.

To the Editor of the "Photographic News."

Sir,—With all diffidence, I venture to suggest that you should acknowledge the receipt of such letters on the above subject as you may receive, and promise us a compact list of the more choice localities; and your readers will listen to the accounts of the rambles of their piscatorial friends—

By the Roding from Chipping Ongar to Barking Creek.

By the Lea from Brockett's Hall to Blackwall, Broxbourne Weir, &c. &c.

By the Brent from Hendon to Brentford.

By the Colne from St. Albans to Staines.

By the Thames at Marlow Bridge, Cliefden, Magna Charta Isle, &c. &c.

By the Mole, on whose banks as the exhibitions show, many nature-loving photographers have been, not uselessly, tempted to linger.

By the Wandle from Croydon to Wandsworth, which supplies more mills, for its length, than any other river.

By the Darent from Westerham to Dartford.

By the Crouch from Orpington to Crouch.

It would be well for photographers to go without their camera to a few of the better known localities, and make their own observations and inquiries. Little can be done after noon; and it would be better—the weather being likely to be favourable, and they somewhat acquainted with the localities—to journey down in the evening, and rise very early. But few places are without early conveyance to London.

Those seeking to photograph plants, should have just a smattering of botany and geology. Beeches and truffles are over chalk; the tusilago on clay (of these many beautiful photographs have been exhibited). Osmunda regalis (a fern) is found on the banks of the Dee, 11½ feet high (S. Murray's British Flora). Felix was, at Hestercomb, near Taunton, so large, that if a grenadier, with cap on, could be carefully let down into the vegetable vase, he would be a formidable vasculum for specimen, but a small camera for faithful representations.

They might look into various books for accounts of old ruins, as Mr. C. Knight's works; Watson's New Botanist Guide for likely places to find the more rare plants; in many works on geology for cliffs, quarries, &c.

Viator.

Miscellaneous.

Latest Foreign Art and Science Intelligence.

The Great Trees of Calavéras, California.—A recent traveller has sent one of the French journals a very graphic description of the above trees, of which we make the following extract:—"California is the land of mineral and vegetable wonders, and

at the late exhibition of agricultural produce in San Francisco, were seen vegetables (cabbage, potatoes, &c.) as they were not seen hitherto but on the canvas of fantastic theatrical decorations. It is the valley of Calavéras, situate at the entrance of the Sierra Nevada, where, 1,500 mètres above the level of the sea, those unheard-of giants of the pine tribe are to be met with. One of them, probably the largest tree in the world, *the big tree*, was 95 feet in circumference, and a height of 200 feet. By a strange freak of Vandalism, this tree has been cut down."—The most important feature of the above article is the botanical disquisition as to the systematic name of these huge trees of the Abietenees. They have borne hitherto the following names: *Taxodium sempervirens*, (Lamb.) *Condylocarpus*, (Salisb.) *Sequoia sempervirens*, (Var. Auct.) *Sequoia gigantea*, (Endl.) *Wellingtonia gigantea*, (Lindl.) *Washingtonia*, (Amer.) Mr. Remy, a botanist, writing in the *San Francisco Chronicle*, says that the name of *Sequoia gigantea* is that most properly appertaining to that most interesting tree.

Carthage—Latest Excavations.—M. Beulé, who has distinguished himself by his researches in the Acropolis of Athens, has undertaken, with equal ardour, the exploration of old Carthage, of which, however, little is left, as Scipio burnt it during seventeen days. The ancient city was divided into three districts, the port, the city properly speaking, and the fort, called Byrsa. M. Beulé began his operations at the latter locality, and after much labour on the steepest part of the hill, he found, at the depth of 45 feet of rubbish, the circumvallations of Byrsa. They are built of enormous masses of tuffa, several mètres in size. The faces are jointed and dove-tailed in a rather regular manner, resembling those of the outer surrounding walls of the first temple of Jerusalem, those in several parts of Greece, and even at Fiesole in old Etruscan fortifications. M. Beulé was able fully to study this subject, as he had disinterred a bastion in the form of a tower, 16 feet high. These towers are continuous, presenting outside a simple wall, but arcuated inside. At the depth of three or four feet from the rock, a thick layer of cinders, charcoal, glass, melted metals, charred timber, broken pottery, &c., attest the extent of injury done to this once famous city.

First Introduction of Typography in France.—The following sketch is derived from accurate sources: "When Guttenberg had invented the *new art*, Schöffer printed the books; but it was Faust who, in the capacity of a merchant, brought them first to Paris: they consisted of the *Psalterium* and the Bible. They were printed black and red by one single process, the types being each covered with one of the two inks. He disposed of them as MSS., copied in a peculiar, uniform, and economic manner. For the sake of being more secure, he did not trust to the people of Paris as vendors of the books, but he brought with him persons who were bound to him by an oath. The sale of these books, however, touched much the interests of the copyists of books, clerks, &c., and as they could not understand the way in which they had been produced, and as the rumour of a certain *new invention* had already reached France, they denounced them to the Parliament of Paris as works of the devil. Faust and his assistants were about to be condemned, when Louis XI., who, perhaps, had obtained a glimpse of the process, interfered, and reversed the sentence of the Parliament *ad absurdum*, and told the Sorbonne that he wanted to have a printing press in Paris; on which two members of this body called three of the pupils of Schöffer to Paris: Gering, Grantz, and Friburger. They arrived in Paris in 1470, and were installed with their machine, not without much fuss and uproar, in one of the halls of the Sorbonne. But it was not until the year 1473 that the first, and a very insignificant book was printed in Paris, entitled *Epistolæ Gasparini Pergamensis*. But soon the two members of the Sorbonne (Fichet and Stein) were obliged to leave France, when the poor printers were also discharged, and were obliged to establish an office of their own, Rue St. Jacques, near the church of St. Benoit, in a house, the shield of which consisted of a *golden sun*. This was the first printing office of Paris."

Perpetual Motion.—M. Bourget, professor at Clermont, thus defines perpetual motion:—"To find a reservoir, which, after having received a determined quantity of fluid, should let escape an indefinite amount without being emptied." A very witty saying—still, not quite conclusive.

M. Agassiz and Descriptive and Pictorial Natural History.—This distinguished naturalist, who is now professor at Cambridge United States, where he enjoys an astonishing popularity, has put forth a plan to publish a natural history descriptive of the whole continent of North America. The work to consist of ten volumes text, and a copious atlas of plates. M. Agassiz had calculated that 500 subscribers, at 120 dollars each, would cover the expense. Scarcely, however, was his plan known, than 3,000 subscribers have placed at his disposal the astounding sum of 360,000 dollars. [An experiment hardly to be tried anywhere else now-a-days.]

Plants—according to M. Dubreil, a Belgian horticulturist—may be pushed to an extraordinary size by watering them with a solution of sulphate of iron, $1\frac{1}{2}$ grammes to a litre of water. Fruits, also, will become of a gigantic size if moistened with that fluid. This is to be done when they have arrived at a quarter of their growth, and it is to be done thrice in succession when the rays of the sun have ceased to shine on them (?).

M. Nièpce de St. Victor and Mr. Burnett.—Since M. Nièpce de St. Victor has published the result of his experiments with the salts of uranium and the different printing processes, which are the result of the application of these experiments, the English journals have, on several occasions, cited the analogous labours of a Mr. Burnett. The priority in the use of salts of uranium in photography belongs, according to them, to this experimentalist, whose name was totally unknown to us until now. In the face of these reclamations, to which we are accustomed, no new invention being announced without giving rise to a host of recriminations of this kind, we judged it advisable to preserve silence. A few days ago Mr. Burnett himself entered the lists, and, in a letter addressed to the *Journal of the London Photographic Society*, he openly attacks, in the most unqualified terms, the good faith of M. Nièpce. This diatribe proves only one thing, which is, that wise as he may be, the writer is ignorant of the most elementary rules of good-breeding. M. Nièpce would certainly not follow his adversary on the ground he has chosen; but, in order to put an end to this polemic, we believe it our duty, in the face of truth, to intervene and ask Mr. Burnett to cite facts in support of his pretensions. Had he, as we are told, made his experiments known previous to our compatriot? In what journal, at what date, and in what terms were they published? The researches we have made in documents we hold in our hands, have been productive of no result. Let Mr. Burnett answer our questions, and we will eagerly do justice to his initiative, while advising him, in future, to be less forward in impugning the good faith of an inquirer, whose reputation has long been established, and who would not, in any case, have been guilty of any other wrong than that of being, like very many others, in ignorance of the labours of an unknown individual.—*La Lumière.*

Absorbent Photographic Powder Colours.—We have our attention drawn to a new kind of powder colours, which have just been introduced under the above name. From the description of their properties, and from experiments made in our presence, they seem to possess some advantages which it may, perhaps, be useful to point out. They adhere firmly to the glass or paper positive, and also to the silver plate, and with them the artist is enabled to lay tint upon tint until the photograph assumes almost the appearance of a crayon drawing, each successive tint being firmly fixed merely by breathing on the surface of the photograph. The first tints are applied as usual; then, by slightly breathing on the surface, the colour will become fixed, the next tint can then be laid on in the same manner, and so on until the requisite depth of colour is obtained.

Photographic Notes and Queries.

THE PALLADIUM INTENSIFYING PROCESS—TONING WITH PLATINUM.

Sir,—I am surprised that you find the chloride of palladium so exorbitantly dear. I got some the other day here in Bristol in the form of a dark solution, like port wine, containing 25 per cent. of the salt, for 7s. 6d. the oz., which would make the price of the crystals about 30s. per oz. But I am much disappointed as to its intensifying power: it certainly does render the image a beautiful black, and would answer excellently, I should think, for toning trans-

parencies on glass; but how slightly it increases the opacity for actinic rays you can, perhaps, judge from the enclosed stereogram, from a negative which I took hastily yesterday, developed (but not very far) by pyrogallic acid, then fixed and washed it, and lastly *thoroughly blackened* one-half of it by palladium, leaving the other half untouched. I think you will scarcely perceive any difference between them; though by reflected light there is a great contrast of colour. As Mr. Hardwich says, it does seem to give decision and clearness, and perhaps will be useful to finish off a picture. I have tried platinum toning, and shall give it up, from the *excessive* over-printing required. I send you a print, which was much over-printed, but is not dark enough now. It is, as you see, a good black, though Mr. Watt said that he could get nothing but browns.

The fact is, I believe, that by using an *acid* solution you can get very good blacks, but must over-print a good deal: whereas with an alkaline solution, or one containing hypo, the only tints obtainable are browns, but still very rich ones, and suitable for some subjects: in this case, so much over-printing is not required. This is what I have found, but it may possibly be wrong, and the theory of it I cannot explain. I now use always the plain alkaline chloride of gold, as directed by your correspondent "Θ"; and I never wish to find a simpler or better process. I warm the solution to about 130°, which materially quickens the operation, and more effectually exhausts the gold; by so doing, I can fully tone, as I have done to-day, at least 200 square inches, with 20 drops of a solution containing but half a grain of chloride to the drachm: and this, in little more than a quarter of an hour. I have found glycerine most useful in keeping the film moist, and enabling me to defer the fixing, and its attendant washings, and, in fact, to do without "a tarnal lot of fixings" in the field, as brother Jonathan would say.

GWENTHLIAN.

P.S.—I would just mention that I have tried the chloride of palladium as a toning agent both with acid and alkaline solutions, and could get no results after an hour's immersion.

BLISTERS IN THE FOTHERGILL PROCESS.

SIR,—I am at present on a visit in the Isle of Man, and have been trying to get some pictures by Fothergill's process. For eighteen months I have worked this process without having a single failure, and now I cannot get a picture worth looking at, excepting by accident.

I have been able to account for my several difficulties after great trouble and many experiments; but I have now met with a trouble which I cannot overcome. I coat the plate, sensitise, wash, coat with the gum preservative, and wash again in three waters at least. In the third water the plates become covered with large clusters of small blisters, perhaps a hundred, in *patches* all over the plate (stereo size). A stream of water poured upon them removes them with the film itself. When dry they disappear as blisters, but their locale is quite distinct, and in development these spots are white and transparent. I have changed the collodion, and tried all kinds. Sometimes I find no blisters occur, and then suddenly I find them again appearing. It may be that the glass is not clean—yet I have used nitric acid solution, alkaline solutions, and the various cleansing solutions recommended, and yet I find my troublesome friends. I use Keene's collodion, and have done so from the first, and always found it first-rate; I cannot think that the fault lies here. Other collodions I have experimentalised with, have served me in the same manner.

As regards exposure, and to show the clearness of the atmosphere in this island, the plates prepared in the same manner as in England require the following exposure in full sunshine and in shade:—

In shade in England	2 minutes.
In sunshine ditto	1½ ditto.
In shade in the Isle of Man	25 seconds.
In sunshine ditto ...	15 to 20 ditto.
Ditto with open portrait lens	3 ditto.

The difference is very great, and well worthy of note. The reflection of light from all sides is so great, that I am obliged to shade the lenses during exposure. The collodion I have referred to is *negative*.

CAPTAIN S. S. B.

Douglas, Isle of Man.

SUBSTITUTE FOR BRASS TUBING.

SIR,—Your "Amateur Mechanic" papers promise exceedingly interesting matter, and must add zest to the continued taking-in of the "PHOTOGRAPHIC NEWS" to many paper photographers, who, like myself, do not yet appreciate its valuable scientific and theoretic articles as they may come to do, and take only a distant interest in collodion practice. Has *papier maché* ever been thought of as a material for cameras and slides? Would it not be very light in weight, and stand the sun well? I have lately used stout saddler's leather, *wetted*, dried round a roller and glued, as a substitute for the ordinary materials for *tubing*. If a ledge was cut half through the thickness of it at one end, before the tube was made, and, after its drying and gluing, the ledge end was re-wetted, a lens could be fitted into the one-edged groove thus formed; the leather being then allowed to dry firmly round it, and having a narrow circular piece of thin leather gummed or glued above, it would be mounted effectually; this first tube should be slid in another tube of leather, directly over it on the roller, with a thin piece of woollen between, to be gummed outside the inner tube, to help sliding, &c. This plan is not so cheap as handy when one has not a turning lathe.

ARTIZAN AMATEUR.

SPLITTING OFF THE FILM.

SIR,—If your correspondent "Reticulus" (vol. ii., p. 203) will adopt the following plan, he will never have any further trouble with his films *creping* or reticulating, or cracking and peeling off, or, indeed, anything of the sort, even when using very contractile collodion.

Make a solution of transparent gelatine—two or three grains to the ounce of water—and filter it whilst hot; keep this by the fire, and pour a little of it over the plate whilst wet, and the plate will dry evenly, and adhere to the glass, even where a tendency to shrink had shown itself in the development of the picture.

It is equally applicable to the wet or dry processes; and the plate can afterwards be varnished as usual.

The same solution will be useful to "Reticulus" (if he be, as he says, "a hard-working photographer") when taking positives for colouring, as it makes the powder colours *bite* into the collodion film beautifully, only requiring the plate to be breathed upon occasionally during the progress of the work.

A picture so coloured does not require to be varnished afterwards.

H. AND J. WALTER.

SUBSTITUTE FOR A GLASS ROOM.

SIR,—I have done my best to imitate Mr. Doubleday's tent (*vide* p. 295, vol. i.), but regret to say that I cannot succeed in taking portraits in it, for various reasons.

If it is placed in the sun, with a southerly aspect, the heat becomes so excessive that I cannot remain in it, the thermometer reaching 94°; if placed in the shade, the exposure becomes too long; I use in it thin curtains, but cannot get light and shade on the face. And, for portability, the tent is made of iron tubing with a flat roof.

It appears so simple that, perhaps, a little assistance will set it going for me. Will it answer if placed in the shade against the sides of a house facing easterly? What aspect has Mr. D.'s tent? Is it in the sun or shade, and does he require and use side and top curtains? So anxious am I to succeed with the tent, that I should much like to see it in use, if Mr. D. would kindly permit such a thing.

B. C. H.

THE FOTHERGILL PROCESS.

Sir,—Seeing in the "News" of May 13th, a challenge from Mr. Draffin to produce a good picture by the Fothergill process in 30 seconds, and likewise letters at different times from many who have failed in working it, I herewith beg to enclose you one of my humble productions, taken by that process in 30 seconds, and which may be some little proof of what could be done in more able hands. I took with me, on the same day, 25 plates prepared by that process, and got 24 as fine negatives as any amateur need wish to take, and not one of them did I expose more than 30 seconds, with a Ross' 4½-inch focus stereo. lens. The plates were prepared with Mr. Keene's collodion, developed according to his formulæ, and kept eight days before exposing. I have scarcely ever had a failure (only through accident) with this process, and think, with due care and proper material, there need never be any fear of arriving at most pleasing results; and, had my health permitted, I should have sent you a few more prints as a further proof. A. F. Stafford.

[The stereogram received is one of the most perfect we have ever seen.—Ed.]

REMOVAL OF SEDIMENT CONSEQUENT UPON DEVELOPING COLLODIO-ALBUMEN PLATES.

Sir,—In answer to Mr. J. Jopling, allow me to state, that after developing a collodio-albumen plate a few days since, on taking it to the daylight I found a sediment formed all over the plate, similar to that which your correspondent complains of; accordingly, I took a small piece of wash-leather and dipped it in water and drew it somewhat roughly over the surface, in order to clean the plate entirely; but, to my surprise, I found that instead of removing the film it merely took away the sediment and left a perfectly clear picture without the slightest trace of a scratch. I have noticed the sediment on many plates, and found the above method of treatment answer in every case.

J. C. Browne.

ANSWERS TO MINOR QUERIES.

Chemicals on a Journey.—*Peregrinator.* You will find it most advantageous to carry as many of the chemicals, &c., as you can in the solid form. We think the most convenient way for you to manage will be to obtain several glass tubes, about four inches long and half an inch internal diameter, made of hard German combustion tubing (to be met with at the operative chemists). These, when sealed up at one end by means of the blow-pipe, and fitted with good corks, will be found far more convenient than glass bottles for holding crystals of nitrate of silver, iodide of potassium, protosulphate of iron, paper packets containing weighed quantities of pyrogallic acid, as well as gun cotton, test papers, marine glue, &c.; as the hard character of the tubing from which they are made, renders them capable of bearing considerable rough usage without breakage; and their shape is such, that they can be tucked away in corners of apparatus without risk, when glass bottles would require special cases for them.

Preparation of Gold Ink.—Gold ink is prepared as follows: take of honey and gold leaf, equal parts; grind them together upon a painter's slab with a muller, until the gold is reduced to the finest possible state of division, and the mass becomes perfectly homogeneous, when it must be agitated with 20 or 30 times its weight of hot water, and then allowed to settle and the water poured off; this process must be repeated with fresh water 2 or 3 times, when the gold must be dried and then mixed up with a little weak gum-water for use.

TO CORRESPONDENTS.

The Stereoscopic Exchange Club.—At the request of several old and new members, we intend shortly to give a complete list of the members of this Club. Additions, corrections, and suggestions are therefore requested to be forwarded without delay.

D. H.—1. You will not find the process you are working give you such clear results as the collodio-albumen or Fothergill process. The stains you speak of may be partially avoided by using perfectly pure water for all the solutions, and adding more acid to the developer; but you will always be liable to meet with them. 2. We hear excellent accounts of it; the enlarging may be effected up to several diameters; in fact, this is only limited by the distance of the sensitive paper from the lens.

E. E. G.—The picture is very inferior. The fault lies more in the printing than in the negative, although a little more vigour would have greatly improved the latter.

E. M. Fix.—Your bath having been in constant use for three years, is now so saturated with organic matter as to be liable to be thrown out of working order on the slightest occasion. Try if a drop or two of nitric acid will remedy it; if that is unsuccessful, make a new bath.

A. G. G.—If you are desirous to take very intense negatives, and your chemicals are in other respects in good working order, you will succeed best by adding a few grains of acetate of soda to your bath. The modification you speak of is well known, and frequently practised.

J. E. G.—In mounting your opera-glass lens for a camera, place the most convex side next the ground glass, and place the stop in front of the lens as far from it as possible, to allow the extent of field required to be covered to be fully illuminated without dark corners. You will not, however, succeed in taking very good pictures with such a lens, as the curvatures are not adapted for giving a flat field.

Capt. R. A.—The albumenised paper is not worth using. You may succeed in painting out the spots, but your best plan will be to burn it all, and get some elsewhere.

S. E. G.—1. Common spring water will do. 2. If you are very careful to clean the dish out perfectly after each operation, the same one will do for all the baths. 3. Liquor ammonia of the chemists is what is meant.

Ignoramus ought not to remain *ignoramus* on such a subject after what has recently been published in the "Photographic News."

S.—1. Where distilled water is recommended it will not do to use spring water. 2. Not necessarily, although they might injure it. 3. Silver wire should be used.

G. C. W.—There are so many different markings which might come under the designation used, that unless you are more explicit in describing the appearance, we cannot suggest a remedy. We know nothing of the lenses named.

C. S. M.—Our correspondent cannot seriously think that we are bound to answer every inquiry sent to us by return of post.

Aspatria.—The *real* process used in the preparation of both things inquired of, is a secret. Processes have been frequently published professing to enlighten photographers on these points, but they are not trustworthy.

S. S. S.—The negative is very good; perhaps a little more vigour would have improved it. The printing is not so successful.

A. R. Mowbray.—We do not see the advantage to be gained by making your glass room as your friends advise, with the roof sloping from the south end to the north. Construct it as you originally intended; or, if you prefer, have a ridge and furrow roof like the Crystal Palace.

A Novice.—1. There can be no possible illegality in taking a view of a mansion without the owner's consent, if your camera is on the public foot-way. 2. No, it should be washed first, and then quickly dried in a cloth: then it will be fit to use. 3. About 7, 8, or 9 inches, according to the movement allowed by the brass mounting of the lens. 4. About 10 or 12 shillings. 5. No.

Beginner.—We are sorry we cannot offer you much encouragement in disposing of your stereograms. They are very good, and if fairly exhibited in shop windows, might possibly have a certain sale; but the production of stereograms on paper is so easy, and the number in the market is so nearly equal to the demand, that the wholesale price for such would be a sum which would be barely remunerative, unless you intended to embark in their production as a matter of business.

Enthusiastic Beginner.—The information you ask for is of so elementary a description, and the questions show so little acquaintance with the necessary elements of the art, that we cannot do better than advise you to cool your enthusiasm a little by carefully studying the many papers on the subjects which you will find scattered through our two volumes.

N.—Lead will always be liable to corrode. You will find it better and cheaper to have the sink lined with gutta percha or slate.

Harrison.—We will write to the inventor, and if we can obtain further particulars, will publish them. Nothing more is known as yet than what we have given.

J. O. S———n.—1. Your collodion is not suitable for positives. Add a grain of bromide of cadmium to each ounce of it; this will, perhaps, make it work better. 2. Add a 40-grain solution of nitrate of silver to your bath until the effect complained of is removed. 3. The iron tablets will spoil the bath if the glaze has the least flaw in it.

S. R. S.—The precipitate is bromide of potassium.

Embryo Photo.—Employ a single lens of about 20 inches focus and 4 inches aperture, with a shading camera on each side of it; one to hold the small picture drawing out from 20 to 36 inches, and the other, for the magnified picture, of about four times that size. Place the most convex side of the lens next the smallest picture. For the details, consult Mr. Sang's paper in a recent number.

A Lady.—Your progress is very satisfactory, and with perseverance you will be as good a photographer as most persons. You must, however, not object to stained fingers. A lady who is not sufficiently strong-minded to brave public opinion on this point, should not attempt photography. Cyanide of potassium will help you in your difficulty, if gently rubbed on the stains with a little water; but constant application of this powerful agent to the skin is calculated to render your hands rather smooth, and white, and soft; perhaps, however, this would not be looked upon as an objection. They *might* also break out into pimples and sore places, which *would* be objectionable.

A Would-be Member must practise a little more: the subject is totally devoid of interest. The negative is bad—the printing worse, and the pictures are wrongly mounted. Were it not for these trifling defects, we should be most happy to comply with our correspondent's request.

W. L.—As a photograph, it is tolerable; but no one would care about the subject.

J. A.—Your communication is received; in its present form, however, we cannot insert it.

Communications declined with thanks.—Lucky.—Philo Photo.—E. M.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—H. B. Y.—Clock.—Spell.—A. B. C.—Janet.

In Type:—Knostian.—F. W. Evans.—G. R.—E. B.—J. S. Overton.—W. H. B. —An Amateur.—D. C. P.—M. A. Root.—G. H. W.—T. Warwick.—B. M. Brackenridge.—J. Walter.—W. L.—D. H.—A. N.

. All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 49.—*August* 12, 1859.

PARCHMENT-PAPER.

WE have often had occasion to remark on the frequency with which discoveries have been made and re-made. The conversion of paper into a substance resembling parchment is the latest instance of the kind with which we are acquainted. The subject is one which is of considerable interest, and as we have not hitherto treated of it in the "PHOTOGRAPHIC NEWS," and as the priority of its discovery has been contested within the last few weeks, we will give a history of its discovery and of the method of preparing it.

On the 3rd April, 1857, the Rev. J. Barlow delivered a lecture at the Royal Institution, of which the so-called discovery, by Mr. Gaine, was the subject. He showed that a mixture of strong sulphuric acid, diluted with half its bulk of water, and then allowed to cool, was capable of rendering paper, momentarily immersed in it, as tough as parchment. The paper thus altered in its properties was instantly washed in a large quantity of water, and then in a weak ammonia solution; after which it was found that the same paper which before the operation broke under a weight of eight pounds had become capable of sustaining upwards of a hundred pounds. That sulphuric acid possessed the property of converting paper into this substance had been known long previously to the date of Mr. Barlow's lecture, but as the precise strength of the acid was unknown, no use was made of it. It was generally supposed at the time that Mr. Gaine claimed the merit of the discovery, and the publication of a part of the lecture by us in a work which we at that time edited, led to a claim by Mr. Harris in favour of Mr. Henry Beasley's prior discovery and publication of the process; but, in point of fact, Mr. Gaine did not claim the merit of the discovery of the fact of sulphuric acid possessing this property, but simply the exact strength requisite in this substance to perform the operation in a satisfactory manner, he having found by experiment that if the strength of the acid much exceeded or fell short of the specific gravity 1·854, or if it was used in different proportions than two parts of concentrated sulphuric acid to one of water, the result was either to char the paper or convert it into dextrine; the latter result likewise ensuing if the paper were exposed to the action of the acid for too great a length of time. The method adopted by Mr. Gaine, for converting a piece of porous unsized paper into parchment-paper, was merely that of drawing a piece of the paper through the solution described above, and then instantly removing all traces of the acid by washing it in the manner we have already stated; after which the paper was converted into a kind of parchment, so exceedingly tough that a ring of it weighing only 23 grains, and only seven-eighths of an inch in width, was found capable of sustaining a weight of 92 lbs., very nearly double what a piece of animal parchment of equal dimensions would sustain. This parchment-paper absorbs water just as real parchment does, and presents a similar appearance; it feels, after being soaked in water, soft and slippery to the touch, precisely as in the case of skins. In the conversion of the paper or lignine into parchment, or by whatever other name we choose to call the substance which is intermediate between lignine and dextrine, the paper, though diminished in its superficial dimensions, is not increased in weight; thus proving that no sulphuric acid is mechanically retained by it; in this respect differing from the gun-papers of Pelouze and others, and being neither converted into an electric nor rendered more combustible, nor capable of solution in ether or potash. The most striking difference in its nature, as compared with what it was previous to the immersion in the acid solution, is observed when it is steeped in water; in addition to its similarity with animal parchment as regards touch, it is, like that substance, insoluble in water, but, unlike it, is not subject to change from the action of heat and moisture. The chemical theory with respect to this extraordinary action of sulphuric acid on cellulose, supposes that the acid combines with it, in the first instance, with or without the elimination of oxygen and hydrogen as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water.

The uses to which paper so converted can be put are so numerous that we have not space to enumerate them; among the principal, however, we may mention its substitution for animal parchment in the case of policies of assurance, scrip certificates, and legal documents. It might also be used with great advantage in the case of books intended for preservation in the library of the British Museum; and we would suggest to the trustees of that institution, that it might be advisable for them to procure an Act to make it compulsory on the publishers of books to prepare the Museum copy in this way. It would involve hardly any expense, as the sheets, after being printed, could be treated with the acid just as well as before, without any injury resulting to the ink, while the book would be rendered imperishable, and almost indestructible.

Before adverting to the mode in which this discovery may be made available in photography, we must say a little more on the subject of its discovery. We have already observed that Mr. Gaine scarcely claimed the merit of the actual discovery of this property of sulphuric acid, though he did not disclaim it, and even took the precaution of patenting his process. Neither is Mr. Beasley entitled to the merit of a first discovery, though it is possible it may have been made by him independently, for his discovery was published in a work of his in 1852, and possibly some little time previously, as the edition of that year was the second edition of his book; but long before that date, in 1846, the discovery had been made by two French chemists, MM. L. Figuier and Poumarede, who published a memoir on the subject at the commencement of 1847, but which it seems was very little noticed at the time, even in Paris and among scientific men; nevertheless, it is a fact that the discovery was made by them at that time, as Professor Hoffman, who has been engaged in experiments with the process, has felt himself bound to admit, that the extraordinary action of sulphuric acid on cellulose was observed by the gentlemen we have mentioned, long anterior to the date of the publication of Mr. Gaine's experiments in the same direction, and that it is to them that is owing the first discovery of vegetable parchment; and he adds, that the only improvement made in their discovery by Mr. Gaine was the addition of half a volume of water to the monohydrated sulphuric acid used by M. Figuier.

On the occasion of Mr. Barlow delivering the lecture at the Royal Institution, to which we have referred, photographs on this paper were exhibited, Mr. Gaine stating that the

peculiarly hard nature of the surface enabled photographers to obtain beautifully rich tones with a much smaller expenditure of nitrate of silver than is usual. The superiority of the print on this vegetable parchment induced us to try experiments with the solution on prints already produced on the paper in its usual condition. We were aware that a less energetic action on bodies was sometimes produced by using strong acids than by using them diluted, and it occurred to us as possible that the strong solution used in parchmentising the print might have no injurious effect on the substance which forms the picture; accordingly, we selected prints which were toned differently, and printed on different kinds of paper, and submitted them to the action of the acid with a result which was considerably better than we had expected. The colour and tint of the pictures was not in the slightest degree changed, and the half-tones remained just as delicate, while the sharpness of the picture was very much increased by the uniform contraction of the paper, and the surface acquired a glossy appearance in some respects superior to albumen, being without that glare which we meet with in albumenised prints, the beauty of the surface being considerably heightened by passing the print between rollers. On removing the prints from the water, after exposure to the action of the acid, the character of the paper was as completely changed as if it had been submitted to the acid before being printed upon. The paper had become so tough that there was not the least danger of tearing it, however roughly it might be handled; and some dirt upon one of the sheets was washed off with soap and water and rubbed dry with a towel, the picture appearing in nowise injured by this rough treatment. For the benefit of those who may desire to try the experiment for themselves, we give the following instructions on the subject. It will be perceived that some slight modifications are introduced, which are rendered necessary by the difference in the paper on which positive pictures are printed.

First take a large shallow pan, and in this place a jug capable of containing about a pint; then measure out 8 fluid ounces of sulphuric acid of the strength given above and pour into the jug, and then add four ounces, by measure, of water, which must be poured into the jug gradually, keeping the mixture stirred during the operation with a glass rod. The amount of heat evolved during the mixing is of course very considerable, and it will be better if it be performed out of doors, in case the heat should break the vessel.

As soon as the mixing is completed, cover over the jug and leave it until cold, when the next series of operations may be begun.

Arrange three clean dishes side by side. No. 1, a porcelain dish about 10 by 12 inches, and Nos. 2 and 3, large and deep, capable of holding about half a gallon each. Pour the mixture of sulphuric acid and water into No. 1, and fill the other two vessels with distilled water, adding to No. 3 a small quantity of ammonia.

Now take the photograph and float it for an instant, picture side downward, on the acid solution in No. 1; taking the same precautions to avoid air bubbles as if the operation were albumenising paper. The picture will curl slightly immediatly after contact with the acid, and its position must be at once reversed, the back of the picture being brought in contact with the solution, and pressed beneath the surface with a glass rod, so that the whole shall be thoroughly immersed; where it must remain for a space of time varying between a quarter of a minute and two minutes, according to the nature of the paper. The conclusions we arrive at in respect to this from the experiments we have had leisure to make are—that Canson's thin paper requires about 30 seconds; Canson's thick paper, 1 minute; thin papier saxe, 20 seconds; Whatman and Turner's, about 10 seconds, supposing the size to have been thoroughly removed, otherwise it will require two minutes to effect the operation. This comparative slowness to be affected in the case of sized paper is not owing to the chemical properties of the size, but simply from its rendering the paper non-absorbent for a time.

When the sheet of paper has soaked for a sufficient time, raise a corner out of the solution, and take hold of it with a piece of folded blotting paper, so as to prevent the acid from coming in contact with the fingers; raise it out of the dish, and hold it over for a second or two to drain. Then immerse it in No. 2, and move it about well, so as to free it as perfectly as possible from the acid. Then transfer it to dish No. 3, that which contains the solution of ammonia, and leave it there for an hour or two, a little time more or less being of no importance; after which it must be well washed, and allowed to dry.

Not more than about half a dozen sheets should be washed in the water in dish No. 2, after which it should be thrown away and replaced by fresh; also in dish No. 3 a piece of blue litmus paper should be placed and allowed to remain, as the slightest trace of acidity in the bath would lead to the destruction of the picture; and whenever any such trace is discovered, a few drops of solution of ammonia should be added and mixed with the water in order to neutralise it. At the same time, it is necessary to guard against any great excess of ammonia, on account of its prejudicial effect on the half tones of the picture.

The appearance of the sheet on removal from the ammonia bath is not very attractive. It presents a crumpled appearance, and requires to be very carefully mounted to render it smooth. The best way of making it assume a satisfactory appearance is to pass it between rollers, the strong pressure it undergoes in this process removing all the creases and rendering it perfectly smooth and glossy; and the advantages of treating photographs in this way will be evident in their increased sharpness.

There is another consideration attached to this process, and that is whether or not proofs treated by it are rendered less liable to fade; and we shall be very happy if some of our readers will put it to the test and inform us of the result for the benefit of the art generally.

[Since the above was in type, a letter has been addressed, by M. Warren de la Rue, to the editor of *Cosmos*, in reply to an article which appeared in that publication speaking in somewhat contemptuous terms of Mr. Gaine's improvements. The tenor of the letter is to point out what we mentioned at the commencement of this article, viz., that Mr. Gaine never claimed the merit of discovering this peculiar action of sulphuric acid, but only how to render it commercially available.]

THE SOLAR SPECTRUM.*

In Sir J. Herschel's paper, already quoted, frequent mention is made of slight variations in the length of the spectra photographed under different circumstances, and with different methods of manipulation. Thus, in some instances, the iodine spectrum was carried down considerably beyond the red rays; in other cases, it hardly extended to the limit of visible colour; and it is, in fact, these remarkable differences of action of the less refrangible rays which form the apparent contradictions mentioned in the article: it being taken for granted that iodide of silver was always affected by rays extending very low down in the spectrum, "degrading in intensity," it is true, "from the blue to the red end," but still sensitive to those rays. Taking the fixed lines, as shown in the above diagram, as our standard, Sir J. Herschel obtains an action upon iodide of silver by rays extending from the highest limit shown in the cut down to the points marked A, B, or C.

Now comes the remarkable discrepancy referred to at the commencement of this article. *Our own experiments have entirely failed to show us the slightest trace of action on iodide of silver by rays lower in the spectrum than the dotted line just below the fixed line G.* We have been working on this subject for several years, with the full consciousness that

* Concluded from vol. ii. p. 254.

we ought to find evidence of some action of the lower rays. We have tried and repeated our experiments, with all the modifications which ingenuity could suggest, and still to no purpose. It mattered not what length of exposure we tried, or what modifications we introduced into the various baths and chemicals used; no natural law could be apparently proved on such uniform and indisputable testimony as this, which seemed to limit the iodine spectrum to the rays above this boundary line.

How ignorant we really are upon the most elementary points of science, when two experimentalists working on the same subject, and with almost the same object in view, arrive at such diametrically opposite conclusions. One states that iodide of silver *is* sensitive to certain rays of light—that it is *always* darkened by them, and produces tangible evidence to bear out the statement. Another states that iodide of silver is *not* sensitive to these rays, and that he has *never* been able to obtain an action by them; and he also brings forward evidence to confirm his statements. Monarchs have gone to war about less important differences than these—scientific men bring their reason to bear upon the matter. Let us see if we cannot solve the difficulty, and show that the discrepancy is only on the surface, after all.

We consider it to be a fundamental axiom in optics that (leaving polarisation out of the question) the refrangibility of a ray of light is absolutely invariable, and that all its other properties depend upon this one attribute. Its angle of refrangibility, or its position in the spectrum with respect to the adjacent fixed lines being given, its optical, thermic, or chemical properties are at once defined, and must always remain, as the necessary and invariable properties of the ray of that refrangibility.

According to this view of the case, then, no variation in the arrangement of the different parts of the apparatus, or of the materials used for refracting the rays of light, could influence the result in one way or another, provided the spectrum was obtained in tolerable purity; neither could a variation in the photographic process employed, or in the order of application of the chemicals, give rise to the discordant results, for we have tried all possible variations of this character without in the least interfering with the uniformity of the results. The only remaining causes of the difference are, the variation of exposure to the light, the difference of its intensity, or variations owing to the development. Our own photographs were taken by the ordinary negative processes on paper or glass, the sensitive iodide of silver being exposed to the action of the spectral rays for a certain period of time, and then being removed, the latent image was developed; the intensity of the light after passing through the extremely narrow slit and then being spread out so as to cover so large a space as was occupied by the spectrum, being too feeble to produce a visible darkening. In Sir J. Herschel's experiments the case was different: the arrangement he used produced a spectrum of the most extraordinary intensity, equalling, if not surpassing, that of undiluted sunlight, and the exposure was prolonged until the iodide of silver actually blackened *per se* without any developing agent being present, or, in fact, needed. To suppose, however, that the difference between our results would be due to the action of the developing agent, would be to assume that iodide of silver would *darken* by exposure to one set of rays, but would *refuse to develop* unless exposed to other rays—a most improbable hypothesis.

The only cause, therefore, that we can imagine for the discrepancies, lies in the differences of exposure. We have stated above, that, from the description of the apparatus which Sir J. Herschel used, we judge the intensity of any particular part of his spectrum to be equal to full sunshine, and the length of time to which his sensitive surfaces were exposed we will assume to be three minutes. We will, therefore, for the sake of comparison, consider the effects which he obtained as being equivalent to an exposure of three minutes to full sunshine.

In our own spectrum the light was admitted through a slit of one inch long and $\frac{1}{200}$th of an inch wide; this was extended by refraction into a band of one inch wide by five inches long; or, the $\frac{1}{200}$th of an inch was stretched out to five inches, and was, consequently, attenuated to $\frac{1}{1000}$th of its original intensity. To this feeble spectrum our plates were exposed, on an average, for three seconds, one-sixtieth part of the time occupied in the other experiments; and when we now remember that the light was only the $\frac{1}{1000}$th part of the intensity of full sunshine, it will make the difference of exposure in the two cases as 1 to 60,000.

We are aware that the above calculation can only be looked upon as a very rough approximation to the truth: we have assumed many things, and set values upon other points, which more exact data would, doubtless, render it necessary to modify; but still, after making every allowance and reduction, the difference in the times of exposure in the two cases cannot fail to be enormous; quite sufficient, we think, to show that the two classes of phenomena under investigation by Sir J. Herschel and ourselves are essentially different, and that arguments and deductions based upon the results of one method of investigation have nothing to do with inferences drawn from the other class of experiments. The plan we are following seems the one most applicable to the present practice of photography. Sir J. Herschel's experiments bear more upon the photography of the future and the elucidation of the grand problem of the fixation of colour.

ECONOMY IN PHOTOGRAPHIC OPERATIONS.

BY ALEXANDER WATT.

IN the various processes of the photographic art, all will readily admit there is a great waste of that precious metal—silver; and, probably, photographers who have not turned their attention to the subject, will be surprised when I inform them that when their work is complete and ready to send home to the purchaser, whether it be a paper or glass portrait, a stereogram, or a copy from an engraving, not more than about five per cent. of the silver employed is actually delivered to the customer. There must, therefore, be 95 per cent. (or thereabouts) of the silver used still to account for. Now this is rather a large per centage, and it is, in my opinion, worth any photographer's while to turn his attention to the recovering the same in any way in his power.

I believe many artists have, from the commencement of their operations, allowed the greater part of the silver employed to be wasted, either because they knew not how to recover it, or laboured under the erroneous impression that the waste which occurred in their operations was but insignificant; and when they have been advised to save their washings, &c., they have neglected to do so, because they had not done so from the first! I have had this reply frequently when advising artists to save their waste.

It is true, some photographers save their clippings of sensitised paper, and their old hypo. baths; but when they have done so they know not what to do with them. I have heard that some have collected their old hypo. baths in a large jar, where they have been allowed to settle for some time, when they have poured off the *clear liquor* and saved the muddy sediment which had settled at the bottom, fully expecting that *there* was the silver mine, whereas the precious store was little else but *dirt*—the clear liquor which was thrown away as valueless having carried with it most of the silver! Several old established photographers have acknowledged this when I have conversed with them on the subject.

Again, I believe it to be almost a constant practice amongst operators to develop over a sink, whereby all the silver, in the form of nitrate and iodide, is allowed to disappear with the developing agent, and the minute quantity of silver which is retained by the plate is all that is saved of the comparatively large quantity of silver which was *taken out of the nitrate bath*.

Now when a "whole plate" is removed from the exciting

bath, it takes with it but a small quantity of iodide of silver, it is true; but, on the other hand, the back and front of the plate are nearly covered with a solution of nitrate of silver, containing about thirty grains to the ounce of water, and when we bear in mind the amount of surface which has been removed from the bath, I think we shall find that the quantity of nitrate of silver which attaches to it is by no means insignificant—especially if a dozen or so are covered in the course of the day, and so on till the end of the year.

It is the practice with some careful photographers to wipe the back of the plate after its removal from the bath—not to save the silver but to keep the plate-holder dry—and the cloth which rubs the plate may, or may not, be taken care of; but the silver which is on the sensitised surface, as I have before observed, is, during the process of development, suffered to run away down the sink, and is never recovered.

The fixing solution—whether it be the cyanide of potassium or the hyposulphite of soda—has, of course, only the iodide of silver, a small item, to deal with, and this fixing solution, plus whatever silver it may contain, is also, generally, allowed to run down the ruthless sink.

In the processes of toning proofs, we have generally a 60-grain bath to deal with; and here, all will admit, a fearful waste of silver may occur, without great care and economy, in a very short time; especially where the photographer's business lies in printing a great number of copies of various subjects, such as pictures, works of art, stereograms, &c. And I believe, nay, I *know*, that the amount of waste which occurs in some establishments, where the printing and toning processes are carried on, is absolutely alarming, and when I have asserted this as a fact, with a view to render a service to the manufacturer of photographs; from an utter want of chemical knowledge, he has listened with an incredulous ear to the caution, and, I suppose, suffers the loss rather than be proved unacquainted with his business! I know of several establishments where, I believe, they are losing at least many pounds a-week in the way I mention.

But as there are others who may take in good part a friendly suggestion, made by one of some experience in the employment of the precious metals, I will take the liberty of submitting a few hints, which I trust may be found not only practicable, but pecuniarily advantageous to those who believe that "a penny *saved* is a penny gained."

Firstly, when the plate is removed from the nitrate bath, after it has been allowed to drain *into the bath* for an instant, the corner of the plate may be placed upon a pad of blotting-paper, and the back of the plate may now be carefully wiped with a *damp* rag. The blotting-paper, when it has been used pretty often during the day, may be set aside in a box kept for the purpose, and the rag may every now and then be rinsed in a vessel of water, which may always stand ready for the purpose on the operating board. When the blotting-paper pads have accumulated, they may be burned to a black ash to send to the refiner with other similar waste, or be thrown into a vessel of water with the washings of the plate wiper; and, in order to recover the silver from these washings, the paper may be squeezed out, after it has been soaking for some time, and a few pieces of sheet copper and a few drops of nitric acid added to the liquor in which the pads were soaked. In a day or two the whole of the silver which the liquor contained will be thrown down in the form of fine grains of pure metal. The clear supernatant liquor should then be poured off, and the silver precipitate be several times washed with hot water; the precipitate may then be dried or dissolved in nitric acid and water, to make nitrate of silver for the sensitising bath, &c.

After draining the plate as above described, the next item of economy will be in the developing. A pan may be employed over which the operator develops the picture in the usual way, and after the developing agent has been allowed to run off into the pan, the plate may be washed over the sink, since the nitrate of silver, in combination with the developer, is secured in the pan. The cyanide being now poured on, after it has dissolved all the iodide, it is returned to the bottle or jug kept for the purpose, from which the silver may be recovered at any time. When the cyanide is saturated from being long used, by precipitating the silver which it contains with strong sulphuric acid, washing the precipitate as before described; adding a few drops of acid to the mass, and throwing in a piece of zinc, which will convert the precipitate into metallic silver. Again wash as before, and it will be in a condition to dissolve in nitric acid.

The pan which contains the developing waste may be emptied into a larger vessel from time to time, into which a few drops of nitric acid have been poured, and some strips of copper. After a few days the precipitate may be separated from the solution above, and, being dried, it may be fused with a little dry potash in a crucible, or sent in a bulk to the refiner, who will allow, perhaps, half its value, which is better than losing it altogether.

The chief waste being that which occurs in the processes of printing, much greater care is necessary to avoid loss.

When the papers have been floated upon the sensitising bath, they are, of course, allowed to drain for an instant, and it is the general practice, I believe, to attach small pieces of blotting paper to the sensitised sheet, in order to assist the process of draining. These pieces of paper, being saturated with nitrate of silver, when they are done with, may be either *at once* put into a vessel of water to soak out the nitrate as before described, or burned to a black ash to send to the refiner, the former being the most economical. All clippings of sensitised paper, also, before they have been acted upon by light, may be treated in the same way.

Old toning baths may have the silver separated from them by passing a stream of sulphuretted hydrogen through the liquid, which will throw down the black sulphuret of silver. This may be converted into nitrate of silver by boiling in nitric acid and a little water. A piece of copper then immersed in a solution of the nitrate thus formed, will throw down the silver in a pure state, which may again be dissolved by nitric acid to form pure nitrate of silver. Evaporation *and crystallisation* are all that is necessary to render it fit for immediate use.

The clippings of sensitised paper which have *not* been exposed to light, if they are plunged into water, will soon yield the nitrate of silver which they contain, and the silver may be deposited therefrom, as before described, by pieces of metallic copper. The paper now only contains chloride of silver, and the clippings, being removed from the washing bath, should be dried, burnt, and kept for the refiner.

It may, perhaps, be hardly thought worth while to recover the hyposulphite of silver from the washings of proofs which have been removed from the toning bath; but if the proofs are rinsed in a vessel of water kept for the purpose, for an instant, previous to being generally washed, even thus a little saving may occur, which, in the course of a year, where large quantities of proofs are produced, may be worth the trouble.

With respect to the little gold which may remain in the toning baths after they have become inactive, I do not think it will be found worth attention, for I have invariably found, when the toning bath has ceased to give the required tone, that it has been because the gold had been removed by the proofs toned in it, and I am of opinion that what remains is not worth consideration.

I have frequently observed, however, that the toning baths have been carelessly or awkwardly made, and in consequence, part of the chloride of gold has been thrown down in the form of a *brown* powder; when this is the case, if the bath is allowed to settle, the gold may be found at the bottom of the vessel, and should be saved. Sometimes, I believe, the gold is precipitated when the toning bath is made in a very strong light, which should be avoided.

Some photographers keep the chloride of gold dissolved

in water for a considerable time before using, so as to have it ready for use; this is a bad plan, as, when a solution of chloride of gold is exposed to light for a time, it will soon decompose, and the gold falls to the bottom or attaches itself to the sides of the bottle.

The above are the principal features of economy to which I would direct the attention of photographers; and if any of the hints which I have thrown out prove serviceable to my fellow-labourers, it will indeed give me infinite pleasure.

I hope shortly to communicate other observations, which, I trust, may not be deemed unacceptable to the readers of the "Photographic News."

METHODS OF ENLARGING PHOTOGRAPHS.

BY MR. DIXON.

Ever since the great discovery by M. Daguerre, the inventive genius of the world has laboured unremittingly, and with varied success, in subduing the difficulties, simplifying the processes, of working and extending this wonderful art to the various useful purposes of life.

The mathematician and mechanic have united their efforts in the production of optical and mechanical apparatus; while the magic hand of the chemist has furnished the means of rendering the light-drawn pictures of nature real and substantial things of life, "as tangible to feeling as to sight."

Do we read a description of cities of far distant countries —of the ruins of Balbec, of Palmyra, of the Pyramids of Egypt, of the ruins of Pompeii—almost instantaneously the wand of the photographer waves over the scenes, and we behold, not a mere picture—a sketch by the hand of the most skilful draughtsman, but we have before us the very impress of the *thing itself;* every rock, and stone, and grain of sand; each crumbling ruin, with all the markings of time; even the very individual leaves of the creeping ivy are placed on exhibition. The living inhabitants of every clime and place, with all their peculiarities and domestic habits, once summoned by this powerful talisman, must appear, not disguised, but *in propriis personis*. Here, the Laplander, drawn by his dogs in a rude sledge on the frozen snow, takes his seat beside the dark-skinned African, who is surrounded by the ever-verdant and luxuriant foliage of the torrid zone; each animal, from every part of the earth, sea, and sky, and the products of every clime and country, may pass, at pleasure, in review before the astonished admirer, as no artist can delineate. History, geography, architecture, mineralogy, and agriculture, are not alone benefited by it; but the embellishments of manufactures in the various arts have received a new impetus, which carries them forward with an *increasing* force; each different branch is being enlarged, and, at the same time, lending its aid to the perfection of the whole. Painting, engraving, lithography, poetry, glass staining, calico printing, and other branches, indicate the progress they have made in a manner not to be mistaken.

I might have mentioned before, that *astronomy* has not been passed by without benefit. Whipple, of Boston, has given to the world a map of the moon, executed by herself, while others have partially succeeded in taking impressions from the fixed stars.

I do not intend to give the *modus operandi* of the various processes, nor to describe the photographic apparatus most in use; but the success of our opticians will be best appreciated by the man of science, who well knows the difficulty of working achromatic lenses of such enormous diameter as 3, 4, and 6 inches, to less than one foot focus; some instruments are even much larger, being not less than 9 inches in clear aperture. The demand for such very large lenses has arisen from the desire for life-size photographs; but the cost of such instruments must necessarily debar many artists of small means from their use; and this having been felt, has awakened the inquiry, "how shall we execute these larger pictures without the means to purchase the larger apparatus?" But even with the *largest* apparatus we cannot produce pictures the size of life; and the special object of this paper is to explain the best means of attaining that end.

The *magic lantern*, once the plaything of our youthful days, was brought out; but the light was found insufficient, and it was returned to its resting-place. The *solar microscope* was then taken up; it supplied the deficiency, and seemed the very thing for the purpose. A negative collodion picture was put in the place of the common slider, and a picture at once was impressed upon the sensitive medium. It required a longer time, of course, to make a picture of such magnified dimensions; but as the object could be kept still for any length of time, that was of little consequence. But the lenses of the common solar microscope being too small, larger ones were substituted, and thus full, life-size pictures were produced from the common size negative on glass. These were put into the hands of the painter, who, now having something to work on besides a blank canvas, was enabled to bring out a more correct likeness, and with greater rapidity, than ever before; still the outline even on this was not perfect, although it answered the ends of the painter better than nothing; and it is in this way the large, full length portraits are made.

We all know that the magnified picture was never well defined. This arose from one of those stubborn laws, well known to the optician, the *inflection* of light, by which a pencil of rays passing near an opaque body is deflected and dispersed. As an illustration, I will suppose that a room be dark, and a small opening in the shutter, through which a very fine pencil of light enters; at a distance from this is placed a white screen, which receives the light, and exhibits a bright spot; but, upon close examination, it will be observed, that the spot is not like a piece of white paper cut out and fixed upon a black ground, but exhibits an indistinct outline, with coloured fringes on each side; and should a wire or thread be now drawn through this beam of light close to the opening, the shadow from it will be far from sharp, but will exhibit a blurred image coloured on each side by fringes in the same manner; and these mixing with the fringes of the circle, give rise to that indistinctness which may be seen on all images thrown on a screen by the solar microscope. Every device that mathematics could suggest, in the configuration of the lenses, have proved ineffectual in correcting this species of imperfection; but, in an apparatus recently devised this difficulty is not encountered. The light is not passed through the picture, and, consequently, near to innumerable opaque bodies, but is *reflected* from the surface, thereby avoiding any interference with the rays in their passage to the tablet or canvas. This apparatus is so arranged, that the sunlight falling on a mirror is reflected and condensed, upon a small daguerreotype or other picture, by which means it is strongly illuminated; directly in front of this is fixed a common small size camera lens, so situated that its axis is at right angles to the plane of the picture, and, being adjustable, a very sharp image is thrown upon the tablet, free from coloured fringes and overlappings.

ON WASHING GUN-COTTON.

BY H. GARBANATI.

Gun-cotton is one of the most uncertain of all photographic chemicals, for though several samples may be made out of the same materials, and apparently under similar circumstances, no two are exactly alike. One of the conditions of good collodion is, that it shall be free from any other matter than that of which it is designedly composed.

I think that enough foreign substance is sometimes obtained in gun-cotton to alter, in some respects, its character. After heavy rains, or even long continued dry weather, when

the surface of water is charged with animalculæ, &c., it is impossible to know what may cling to the fibres of the cotton. For instance, let us take the same quantity of water required to thoroughly wash gun-cotton, and filter it through a piece of blotting paper, and we perceive a large quantity of intercepted matter, most of which would have otherwise clung to the cotton, and of course become part of the collodion.

Now this matter, little as it may be, might have an influence on the collodion which we could not take into consideration. It is, therefore, worth while to filter the washing water, since it may be done with no appreciable trouble.

Dictionary of Photography.

Fluorescence (*continued*).—"He was thus led to contemplate the possibility of a change of refrangibility. No sooner had he dwelt in his mind on this supposition, than the mystery respecting the nature of epipolized light vanished; all the parts of the phenomenon fell naturally into their places. So simple did the whole explanation become, when once the fundamental hypothesis was admitted, that he could not help feeling strongly impressed that it would turn out to be true. Its truth or fallacy was a question easily to be decided by experiment; the experiments were performed, and resulted in its complete establishment.

"The lecturer then described what may be regarded as the fundamental experiment. A beam of sunlight was reflected horizontally through a vertical slit into a darkened room, and a pure spectrum was formed in the usual manner, namely, by transmitting the light through a prism at the distance of several feet from the slit, and then through a lens close to the prism. In the actual experiment, two or three prisms were used, to produce a great angular separation of the colours. Instead of a screen, there was placed at the focus of the lens a vessel containing a solution of sulphate of quinine. It was found that the red, orange, &c., in fact, nearly the whole of the visible rays, passed through the fluid as if it had been mere water. But on arriving about the middle of the violet, the path of the rays within the fluid was marked by a sky-blue light, which emanated in all directions from the fluid, as if the medium had been self-luminous. This blue light continued throughout the region of the violet, and far beyond, in the region of the invisible rays. The posterior surface of the luminous portion of the fluid marked the distance to which the incident rays were able to penetrate into the medium before they were exhausted. This distance, which at first exceeded the diameter of the vessel, decreased with great rapidity, so that in the greater part of the invisible region it amounted to only a very small fraction of an inch. The fixed lines of the extreme violet, and of the more refrangible invisible rays, were exhibited by dark planes interrupting the dispersed light. When a small portion of the incident spectrum was isolated, by stopping the rest by a screen, and the corresponding beam of blue dispersed light was refracted sideways by a prism held to the eye, it was found to consist of light having various degrees of refrangibility, with colour corresponding, the more refrangible rays being more abundant than the less refrangible. The nature of epipolized light is now evident; it is nothing but light from which the highly refrangible invisible rays have been withdrawn by transmitting it through a solution of quinine, and does not differ from light from which those rays have been withdrawn by any other means.

"The fundamental experiment, excepting that part of it which relates to the analysis of the dispersed light, was then exhibited by means of the powerful voltaic battery belonging to the Institution, which was applied to the combustion of metals. The rays emanating from the voltaic arc were applied to form a pure spectrum, which was received on a slab of glass coloured by peroxide of uranium, a medium which possesses properties similar to those of a solution of sulphate of quinine in a still more eminent degree.

"The difference of nature of the illumination produced by a change of refrangibility, or 'true internal dispersion,' from that due to the mere scattering of light, may be shown in a very instructive form by placing paper washed with sulphate of quinine, or a screen of similar properties, so as to receive a long narrow horizontal spectrum, and refracting this upwards by a prism held to the eye. Were the luminous band formed on the paper due merely to the scattering of the incident rays, it ought of course to be thrown obliquely upwards; whereas it is actually decomposed by the prism into two bands, one ascending obliquely, and consisting of the usual colours of the spectrum in their natural order, the other running horizontally, and extending far beyond the more refrangible end of the former. Whatever be the screen, the horizontal band is always situated below the oblique, since there appears to be no exception to the law, that when the refrangibility of light is changed in this manner it is *always lowered.*

The Amateur Mechanic.

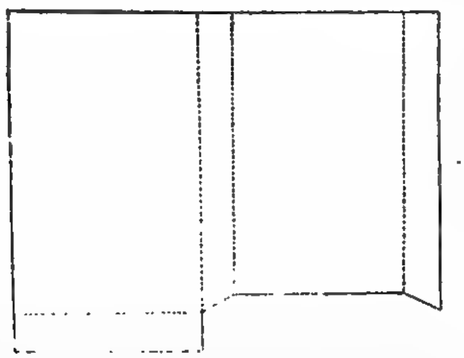
Gutta Percha—(*continued*).

A vertical dipping bath, either for nitrate of silver or developing solution, may be made of gutta percha in two or three ways. It may be formed on a mould, in the same manner as described in a former number for the moulding of dishes. The mould may, in such case, be made of any shape the manipulator may choose; it will be wise, however, to give the front side a slight lateral curve, so that the front of the bath shall be slightly concave inside. The advantage of this will be found in the fact, that if a plate fall forward from the dipper in raising it out of the bath, it will only come in contact at the edges of the plate, and so preserve the film. In forming the joints, after having adapted the plastic material to the form of the mould, it is important that the surfaces to be joined should be perfectly free from moisture. To insure this, and, at the same time, impart a more thoroughly sticky character to the softened gutta percha, the edges may be passed through the flame of a spirit lamp, and then immediately pressed together firmly.

Another method—one by which a great many baths are made for sale—consists in joining the several sides and edges together, each being a separate piece cut out of the sheet. The best plan for an amateur who wishes to adopt this method is to proceed as follows:—Procure a piece of wood the size and shape of the inside of the intended bath; as this is not to be used as a mould, but merely to give a firm block on which to join the pieces together, it need not be smoothed or finished with any especial care. Cut two pieces for front and back, of the requisite size, from a sheet of the proper thickness, and three narrow pieces for the sides and bottom. The side pieces had better be just the width of the thickness of the block, whilst the front and back will be just twice the thickness of the sheet, or a little more, wider than the block, so as to inclose or join over the sides. The piece for the bottom must be twice the thickness of the sheet wider than the thickness of the block, so as to inclose over the front and back. The pieces being all prepared of the proper sizes, take the front and soften one edge in hot water—not more than about half an inch need be softened—and treat the side to be joined to it in the same manner. Then dry the surfaces carefully, and pass one edge of the side piece through the flame of a spirit lamp, and lay it on the edge of the block; now quickly take the front piece, and pass the surface that is to join the edge of the side also through the flame of a spirit lamp, and immediately bring them together, working them into close and firm contact with the finger and thumb; the softened edge of the front piece should be worked round the edge of the side piece so to form a shoulder, and thus give additional strength to the joint. The back should now be treated in the same manner, and then go through the same process with the other side. The bottom piece, as we have said, should be large enough to cover all the other edges; it should be joined in the same manner, and may then be worked round all the edges as we have described for the sides. The use of the block of wood will be found a great aid in keeping the whole firm in the process of joining.

If carefully managed, a very neat bath may be made in this manner. It possesses, however, at all times, the drawback of having eight joined edges, each of which involves more or less

risk of parting and leakage. A simpler method, and one which we therefore prefer, is on the principle we recommended as the easiest for making a dish; and this will involve only four points. Cut a piece of sheet gutta percha of the following shape, and the right dimensions:—



This piece, as will be seen, when folded in the direction of the lines, will form a bath; the bottom of the side pieces may be cut at any angle, as the manipulator may choose, such angle, of course, governing the position, vertical or sloping, in which the finished bath will stand. The point of a sharp penknife is to be, by the aid of a straight-edge, run along in the direction of the dotted lines, making a very slight incision: this incision will enable the manipulator to bend the gutta percha to form right angles. There will be one side joint to form, which may be done just in the same manner as in the former method described. The bottom will be joined up in the same manner; and if it be cut a little larger than the back and sides, it may be worked well over the edges whilst soft, so as to strengthen the joint. If necessary or desirable, each edge, where an incision has been made, may be strengthened by the application of a piece of thin gutta percha, which should be neatly pared down at the edges. It is then, as we have before described, to be softened by quickly passing through the flame of a spirit lamp; the edge to which it has to be applied being treated in the same manner, and the two then pressed into contact. A neat bath, sufficiently strong for most purposes, at least in baths of moderate dimensions, is thus very easily and quickly made.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 8th August, 1859.

Every attempt to do away with silver and gold in photographic operations ought to be encouraged. M. Poitevin has lately published a process for obtaining positives without employing any salts of silver. This process is based upon an observation made by M. Nièpce de St. Victor, who remarked in his third memoir on "The New Action of Light," that "a sheet of paper imbibed with gallic acid, insolated, and then treated with protosulphate of iron, will give a bluish black image; and that the result would be the same if the operations were reversed."

M. Poitevin's method consists of the following operations:—A dissolution of perchloride of iron (10 parts of perchloride to 100 of water) is mixed with an equal volume of a dissolution of nitrate of uranium (10 parts to 100 of water); and, after having damped one side of a sheet of thin photographic paper, this paper is placed, with the dry side downwards, on a sheet of glass, and the abovenamed mixture poured over it. The sheet of paper is then allowed to dry in a dark place. When dry, it has a dark yellow colour.

When an engraving or a photographic proof is intended to be obtained upon the paper thus prepared, the former is placed before the latter, and the whole exposed for about 15 minutes to the sun. If a photographic proof is employed instead of an engraving, it must be a positive proof, as the parts of the paper prepared as above, which are influenced by light, become white. These white parts result from the transformation of the perchloride of iron on the paper into protochloride, which is not influenced by the gallic acid employed to develop the image. To render the image black, the sheet of paper is again damped as before, by laying in upon water for a few instants, and then applying it to a glass plate, and pouring over it a saturated dissolution of gallic or pyrogallic acid, or even a concentrated infusion of gall-nuts. The parts where the perchloride of iron has not been decomposed by light become, in this operation, of a dark violet colour. To fix the proof, it is sufficient to wash it in water, which is renewed once or twice, to sponge it a little, and to let it dry. The colour of the image becomes more intense on drying.

"The proofs thus obtained," says M. Poitevin, in conclusion, "are as unalterable by atmospheric influences as writing made with ordinary ink." This is certainly not giving a very good guarantee of their durability. The protoxide of iron contained in ink, does not fail, when exposed for some time to the atmosphere, to become red from the formation of peroxide. Black silk hats, whose colour is likewise owing to protoxide of iron, become reddish brown from the same cause, particularly at the sea-side, where the air is pure and acts vigorously. In such cities as London and Glasgow the black carbonaceous matter which almost constantly floats in the atmosphere, must cause considerable injury to the hatter's trade. At Ostend, on the contrary, where a delightful sea-breeze often wafts chloride of sodium through the air, hats and black coats soon become of a reddish tint, and one of the most flourishing shopkeepers in the place is a *marchand de chapeaux*.

The *Bulletin de la Société Française* contains an immense article on "Photographic Processes in Collodion," by a Mr. Migurski, of Odessa. This article is far too long to reproduce here, and I must leave you to judge whether or no it is worthy of insertion in the "Photographic News."

I hear that in Turkey the Grand Sultan himself has composed a photographic album, which is guarded as carefully as the doors of the harem. The fact is, that the principal subjects which adorn this album are proofs of the most beautiful women of the seraglio in the most primitive of all costumes. M. Wittwer has published in *Poggendorff's Annalen* a dissertation upon the action of light upon chlorine water. The author endeavours to prove, contrary to the assertions of Bunsen and Roscoe, that the chemical action of light may be measured with sufficient accuracy by employing an aqueous solution of chlorine gas; and that it is not at all necessary to have recourse to a gaseous mixture of chlorine and hydrogen.

It is, perhaps, well to remind those of your readers who would experiment upon the chemical action of light by means of a gaseous mixture of chlorine and hydrogen, as imagined in the first place by Professor Draper, that very small quantities of this mixture must be employed at a time. A single ray of sunlight will cause a flask containing such a mixture to explode with a loud detonation, whilst the glass is shattered into a thousand pieces!

In these sorts of experiments we have often to deal with a mixture of hydrochloric acid and chlorine, and it is often necessary to be able to determine accurately the relative quantities of these two substances. For this reason, I shall inform you of an elegant method of effecting this, discovered some years ago by Dr. C. J. Koene, of the Brussels University. Sulphate of potash is transformed, by hydrochloric acid, into bi-sulphate of potash and chloride of potassium; but chlorine has no such action:—

A gaseous mixture, containing hydrochloric acid and chlorine, when passed into a solution of sulphate of potash, leaves the hydrochloric acid in solution as chloride of potas-

sium, whilst all the chlorine may be chased off by a current of air.*

The effects of light upon chlorine water I have already mentioned in one of my former letters, when speaking of the efficacy of this solution in curing wounds from the dissecting knife.

It is interesting to compare this action of light with that of electricity. M. Alfred Riche, of Paris, studied, some months ago, the phenomena that present themselves when an electric current is passed through a solution of chlorine, bromine, or iodine, in distilled water. The galvanic apparatus employed was composed of ten Bunsen's elements, and the gases produced were received in two tubes of equal length. The results obtained are as follow:—

First, the water is decomposed, oxygen is evolved, and hydrogen unites with the chlorine, iodine, or bromine. Exactly the same effect is observed when the solutions of these metalloïds are exposed to the action of light or heat.

After a certain time, however, the action of the electric current is completely reversed—oxygen is absorbed, and hydrogen is evolved in abundance. The solution, after the experiment, is very acid, but does not precipitate with salts of silver; the acids it contains are the *oxides* of the metalloïds employed. A solution of potash produces a precipitate when chlorine has been experimented upon, showing that the liquid contains *perchloric acid;* but with bromine and iodine the oxydation never proceeds farther than *bromic* and *iodic* acids. The author's hopes of obtaining, in this manner, *perbromic acid*, were not realised; he believes, however, that the foregoing method of experimentation is the best manner yet known of producing perchloric, bromic, and iodic acids. M. Riche does not say whether *peroxide of hydrogen* or oxygenated water is, or is not, produced in these experiments; but I have heard it said, that this curious combination is formed when a solution of chlorine is exposed to the action of light.

Last Monday, M. Riche presented to the Academy of Sciences at Paris, a paper on the action produced by the electric current emanating from three Bunsen's elements on a mixture of acetone and different acids. When a mixture of acetone $C_6H_6O_2$ and hydrochloric acid is employed, an oily substance is obtained—$C_6H_5O_2Cl$ which is acetone, having one of its equivalents of hydrogen replaced by an equivalent of chlorine. Similar compounds are formed with hydrobromic and hydroiodic acids, though M. Riche is not quite certain about the iodine compound.

$C_6H_5O_2Cl$ is a colourless liquid, very limpid, which irritates the eyes and the nose; its density is 1·14 at 14° (centigrade). The density of its vapour is 3·40. Atmospheric air has no influence upon this compound, and the latter has no action on the litmus paper.

$C_6H_5O_2Br$, the corresponding body formed with bromine, is a colourless liquid, which becomes brown in a few minutes. Its action upon the eyes is so powerful, that it is impossible to remain in a room where a few drops of this substance have fallen upon the floor.

The iodine compound has not been obtained in a separate form.

When the electric current is directed through a mixture composed of acetone 2 parts, water 1 part, and nitric acid 1 part, no oily substance is formed, but the liquid acquires a strong smell of vinegar, and by saturating it with carbonate of potash, evaporating and treating the salt obtained with alcohol, a certain quantity of acetate of potash is extracted. The salt obtained by evaporation (before being acted upon by alcohol) when treated with potash evolves ammonia and methylamine. The presence of ammonia in this case may be explained naturally enough by the union of the nascent hydrogen and nitrogen in the liquid containing nitric acid. But to explain the presence of methylamine, it is necessary to admit that the radical methyle, C_2H_3, exists in acetone, or is produced by the decomposition of the latter.

"This experiment," says M. Riche, in conclusion of his interesting paper, "would appear to confirm the hypothesis expounded formerly by Gerhardt, who considered acetone, $C_6H_6O_2$, as a compound of methyle and acethyle: C_2H_3, $C_4H_3O_2$; aldehyde being an hydrure of acethyle: $H, C_4H_3O_2$.

I must rectify an error contained in my last letter concerning M. Naudin's researches in the plants of the melon tribe. The statement was taken from one of the first scientific papers of Paris, but is completely erroneous. M. Naudin has not described twenty-eight species of melon, but he has shown that the whole twenty-eight species that are at present admitted by botanists must be brought down to ONE SPECIES! He has shown that all the other pretended species are merely varieties, which he has produced artificially, *every one of them*, by crossing or hybridation. Some of these varieties are, however, very permanent.

The French are about to elevate a statue to your countryman, Dr. Jenner, the discoverer of vaccination. The model is exhibited near the *Pont des Arts*. Some of the less informed journalists of Paris are inclined to believe that Dr. Jenner was a Frenchman! They base their assertion on the fact of his having been born at Boulogne-sur-Mer (?). This reminds me of the Irish lady, resident in England, who, having engaged a servant, said to her, "Betsy, you and I are sure to agree, as we are both Irish." "If you please, ma'am, who told you I was Irish?" inquired the maid-of-all-work. "Why, you told me yourself you were born in Dublin," rejoined the mistress. "Lor! ma'am," interrupted Betsy, "if I told you I were born in a stable, would yer take me for a horse?"

* Memoires de Chimie par le Dr. C. J. Koene, professeur de Chimie et de Toxicologie à l'Université de Bruxelles (Première partie). Bruxelles: P. Larcier, 1856.

THE MANUFACTURE OF COLLODION.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—Bestowing advice gratuitously is at all times an unthankful task, more especially as among those to whom you give it will be found persons who, either from prejudice, self-conceit, or obstinacy, will not follow your advice, be it good or otherwise.

From the observations of your correspondent, "A Manufacturer of Collodion," the world is led to believe that imperfections and variableness in collodion are utterly out of the question, that the article *must* always be alike—always *good;* an assumption which, I expect, few artists will allow to be founded on fact.

I will now, with your permission, reply in detail to your correspondent's rather extraordinary epistle. In the first place, he says, "It is incorrect to suppose that a superior ether could be prepared by getting samples from different houses and mixing them together," and asks, "What could constitute the superiority of the substance so prepared?" Now, in reply to this, I beg to say that the "Manufacturer" has misread my remarks in this, as in many other instances. I never used the word "superiority" at all: I merely recommended obtaining the ether from "several establishments" in order to "insure *uniformity*" in this article, as it is *sometimes*, I believe, and *not always*, prepared from methylated spirit, and which, I have been informed by some photographers, has caused collodion to exhibit peculiar characteristics. I do not conceive how, by the admixture of various samples of ether, a "vague substance" would result, as it would be quite as easy to ascertain the specific gravity of a mixture as it would that of one sample alone.

In reference to my suggestion respecting the preparation of pyroxyline in lots, and then carefully mixing them together, your correspondent has again entirely misinterpreted and misread my remarks. In recommending that the different batches of pyroxyline should be mixed together, I did so in order that the article should thus be *averaged*, as it is well known that it is nearly impossible to prepare two samples

alike. Whether the stock prepared be sufficient for a week's supply or a year's, I conceive that it would be well to mix the whole bulk, so that whatever may be taken from the stock, from time to time, will be an *average* of the whole, or nearly so. Unless this is done, uniformity is out of the question.

"A Manufacturer," &c., also objects to my hints respecting the admixture of the samples of alcohol, and tells us that he gets this article from a wholesale dealer, when he subjects it to "rigorous purification." Well and good. But can he confidently assert that the strength of this article never varies when added to the ether in making the collodion? Is it *always* of the same strength—unvarying as a chronometer? If not, *uniform* results are impossible.

Again, I am told that my precautions about the iodising solution are superfluous, as "we" are perfectly "alive" to the importance of adding a certain amount of iodide to the collodion, and then follows a joke about telling a brewer to add malt to the water to make good beer. And your correspondent seems to think it impossible that a deposit of crystals of iodide can take place in the collodion. Now, this, I assert, is an every-day occurrence, and I can name, at all events, *six* different houses from whom I have procured collodion which has deposited crystals of iodide—some an hour or two after I had bought it—others on the following day, not only on the bottom and sides of the bottle, but also on the *stopper*. I beg to urge that it is not so much the amount of iodide which is added to the collodion that is important, but the amount which *it retains in solution after iodising*. This will depend, of course, upon the conditions of the alcohol and ether as to strength and the temperature at which the iodising took place.

In the concluding paragraph, objection is taken to my having advised photographers to mix several collodions in order to obtain an *average* article. Of course, from obvious reasons, "A Manufacturer of Collodion" could *not* recommend this plan—*that* we can readily understand. But when we are told, that although collodion makers may adopt "slightly (!) different methods, the result is *substantially the same*," I think we may truly express our surprise. There is something more than a *slight* difference between those collodions which are iodised with ammonium or potassium, and those with cadmium; as also between those prepared with pyroxyline and xyloidine, and the results, I maintain, are as widely different from each other as chalk is from Irish bog oak. There are no two collodions alike—not even if made by the same man.

Now, having replied, I think, to the chief points of your correspondent's letter, may I be allowed to offer a few general remarks thereon?

When I offered the suggestions complained of, I did so as much with a view to assist manufacturers, if I could, as the profession generally; and I trusted that any well-meant hint would be accepted in a generous spirit, as I feel convinced it will by manufacturers at large, although there may be a little tendency to self-laudation in one of them; and I may mention that I have given precisely the same hints to several collodion makers, personally, who have all received them with courtesy and approval. It is something quite new for us to be led to suppose that collodion, as it now enters the market, is faultless and needs no improvement; few will cherish this idea, I fancy, for experience teaches us that it is never uniform in quality.

Hardwich, in his admirable "Manual of Photographic Chemistry," says:—"Now, in preparing collodion for photographic purposes, we find that its physical properties are liable to *considerable variation;*" and further, "it often happens in preparing pyroxyline that two portions of nitro-sulphuric acid taken from the same bottle yield products varying in their solubility, although they must necessarily be the same in composition." There is no doubt whatever that this is the case; and, although the resulting compound may in each case be chemically the same, it is quite possible that a collodion which is made with the most soluble form of pyroxyline may differ in its photographic action from that which was prepared with pyroxyline less soluble. I believe that that form of pyroxyline which is the most *attenuated* would form the most sensitive collodion, and *vice versâ*. If this is the case, then, an *average* of each quality being *always* sent into the market, we should have, I doubt not, a more uniform article than that which we can now procure, and this, I am confident, is of great importance to photographers.

Apologising for the length of this communication, and trusting that you will do me the favour of inserting it, I am, Sir, yours obediently, ALEXANDER WATT.

PHOTOGRAPHY IN THE ISLE OF THANET.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—As I promised to send you a second communication from this place, I avail myself of the opportunities which a day devoted to printing gives me to fulfil my promise. The weather generally since I last wrote has been so favourable that I have had abundant opportunities of testing the relative merits of the collodio-albumen and the Fothergill processes, and I have been working with them indifferently, with varying results. On the whole, however, the balance is in favour of the collodio-albumen. There is a greater amount of depth and intensity in the negatives taken by this process, which compensates for the additional trouble in preparing the plates.

I rather think the publication of my last communication to you may have had the effect of sending some photographers down into this part, for I have seen several cameras in the course of my wanderings about here since, at least one of which has gone the way which neither its maker nor its owner anticipated. I was walking from Margate towards Broadstairs, when I saw a photographer who had planted his camera on the edge of the cliff at Kingsgate, with the object of taking a view of the opposite side of the inlet. The day was very dull and cool, so that I had left my apparatus at home, having no desire to run the risk of getting spoiled negatives, which is the pretty certain result of working with the dry process on such a day; therefore I was quite at leisure to enter into a conversation with him. He told me he had taken a picture of the castle, which, because it was built in an antique style, he imagined must be an ancient place, and talked of getting permission to visit its dungeons, and so forth. I had just finished telling him the story of the old lady who made a similar mistake to his own, and the Margate boatman; how the old lady had burst into raptures at the sight of the castle, and poured a volume of romantic rhapsody into the ears of the unsympathising boatman, and concluded by asking him "How many hundred years old is it?" to which the Charon replied, "Lord, mum, 'taint much older than yourself, for my father helped to build it"—an answer which surprised the old lady in more ways than one.

While I was telling him this he had been holding his watch in his hand, and was in a perfect state of confusion as to what would be the proper amount of exposure. "Half a minute won't be enough on a day like this," he muttered to himself; "I'll give it fifteen seconds more. It is very dull—I may as well let it stay in the minute. They say it is better to over-expose than under-expose—it shall stay in fifteen seconds longer." He was even then in doubt whether it would not be better to let it remain a little longer, when a circumstance occurred which proved beyond question that the exposure had been already too prolonged. He was watching the progress of the hands of his watch, and I was in the act of looking for some stones to exercise my arm by jerking them down on the beech, when I heard a rather loud hollow sound, and looking round I found that the camera had disappeared. It had been planted on the very edge of the cliff, and I have not the least doubt was knocked off with a stone. At all events, when we got down on the beech, we found the camera with one of its sides knocked

out by striking against the cliff, and the plate lying in a little pool of sea-water, having buried beneath it an unfortunate little crab, who, in his feeble endeavours to release himself, covered the film with a series of convoluted lines which it would have puzzled even you to account for, if you had been requested to do so by an inquiring correspondent. The worst part of the affair, as regarded pecuniary loss, was from the fact that the concussion had cracked the lens half-way across. Who threw the stone he could not find out. There were a couple of strangers on the cliff at a little distance, but both of them declared that they had thrown no stone, so the unfortunate proprietor of the damaged apparatus had to bear his loss in the best way he could.

In my last letter I alluded to the objects of interest offered by the Isle of Thanet to photographers; and if it is not trespassing too much on your space, I will add a little more to the information I have already given your readers on this point. Among other places, well worth a visit to the photographer, is Minster. This village contains several picturesque cottages, old gable-ended buildings, such as are rapidly crumbling away throughout the land, and which, if for that reason alone, it is advisable should be pictorially recorded by the agency of photography. Buildings like these are best suited for stereoscopic pictures, and all that I took in the village were for the stereoscope. The church is worth taking, both externally and internally, not on account of its surpassing beauty, but from the fact that it is believed to be the oldest church in England, with one exception. It was built by the monks, who formerly had a monastery attached to it, and though it has been a good deal dilapidated by over-zealous individuals, in comparatively recent times, very much has been done in the way of restoring it to its pristine condition within the last few years. Those who may visit this place, and even those who may not, will feel some interest in knowing that the monastery to which it was attached was founded so long ago as A.D. 670. The church was partly burnt down by the Danes, and the nuns scattered about the country, but was subsequently re-built by King Canute, on his return from his pilgrimage to Rome. I believe that if it were generally known that it was in the island in which this church is situate that the first Christian missionaries landed, and that it was from this spot that the Christian religion spread like a wave over the whole of England, much more interest would be felt in visiting it, and in obtaining pictures of objects which have so many interesting associations. We get enthusiastic over a bit of ground where a battle was fought between the Greeks and Romans, but we have no enthusiasm or regard for the scene of an occurrence so commonplace as a battle between the ancient Britons and the Romans. Nearly every part of the Isle of Thanet has been the scene of conflicts between Britons and Romans, and Saxons and Danes; and although I would not expose a plate for the mere sake of getting a picture of an otherwise uninteresting spot, simply because a mound of earth or the remains of a fortification denote that it was once the scene of a bloody battle, yet I find it adds very much to the interest with which a picture of a picturesque farmhouse is regarded, when I am able to point out, in a corner of the print, a mound or fragment of a building, and tell the traditions attached to it. I have not travelled very much in England, but as far as my experience goes there is no county which possesses more interesting subjects of this kind than that from which I date this letter; and I think if this were generally known, many of our London brethren, who now think that good pictures cannot be taken anywhere this side of the Lakes of Cumberland and Westmoreland, or North Wales, would have a desire to visit this part instead, to the great saving of their time and money. For my own part, I am extremely pleased with my visit, which has not been confined entirely to the island itself, but has extended over other parts of Kent, respecting which I may have something to say on a future occasion. E. B.

Broadstairs.

Miscellaneous.

Latest Foreign Art and Science Intelligence.

Photography in Russia.—The late inauguration of the bronze equestrian statue of the Emperor Nicholas, situated as it is in one of the magnificent squares of St. Petersburg, formed by the huge Isaac church and other large buildings, has been a matter of great interest throughout Europe. The statue has been made after the design of Baron Klodt, and has cost 750,000 silver rubles. This festival act has been photographed by M. Richebourg, and a print thereof has appeared in the Paris *Illustration.*

Paris Art Exhibition: Salon of 1859.—We may well say of most of the sites and landscapes of Europe, as far as oil-painting is concerned, "*Omnia jam vulgata;*" and conclude by saying, "*Tentanda est via.*" We must look out for new paths. Thus, M. Belly has gone to Egypt for his subjects, and has exhibited four paintings. One, of great dimensions, is "A wandering Algerian Tribe, passing through the Desert, in search of an Encampment." "The Nile at Sunset" possesses all the charm of clearness of the Eastern sky. At the end of the horizon appears an island overgrown with palms; it is yet lighted by the sun, and contrasts powerfully with the bluish darkness of the river in the foreground. M. Brechère, also, has visited Egypt, and has exhibited several paintings of that country. "The Colossi of Memnon during the Inundation of the Nile," is considered the best of M. Brechère's works, on account of its solemn serenity and quiet. The clearness of the sky reflects pleasingly in the clearness of the water. On the farther banks of the river some fires are lit, and two slender columns of smoke, ascending straight to heaven, attest the perfect quiet of the air. The two Colossi, of sandstone, start up in the midst of the picture, and appear like the guardians of all those temples now in ruins; while their majestic figures have now withstood the changes of *thirty-five centuries!* M. Parini has even gone beyond Egypt, and has exhibited "The Passage of a Caravan across the Defiles which separate Persia from the great Steppes of Khorassan." A great deal of local tint characterises this picture; but there are *none* in Europe, probably, who can attest to its authenticity or truth. But as historical pictures become rare, a series of *new* genres appear. Thus, the painting of animals is largely represented in the Paris *Salon*, and Messrs. P. Rousseau, Troyon, and August Bonheur have exhibited valuable pictures. The portraits (such as they are) appear in the proportion of 866 to 2,045, the latter being the number of articles mentioned in the catalogue. M. Hippolite Flandrin has exhibited the portrait of Mdlle. M., which is considered the gem of the whole exhibition. A French art critic speaks thus on the *delicate* subject of portraits: "In fact, we may, after all, wonder at the even small number of able portrait painters, if we consider the commonplaceness (*banalité*), the want of types, and the little interest which their originals present to them. This observation of commonplaceness follows you in the Salon of the Exhibition, as we could make it every day around us, in pacing through the streets of Paris. We are far from being one of the handsome races on the earth. Thus, for the sake of obtaining a fictitious *character*, many are not satisfied with sitting naturally before the painter; they give themselves a certain air, and assume thus a sort of artificial features."

Paper *v.* Collodion.—With "paper photography," which requires to be left from ten minutes to half an hour in the camera, an over or under exposure of a few minutes is of no importance, while an error of the same number of seconds in collodion is enough to spoil all. Hence it is a positive advantage that the whole process should be completed on the spot, since the cause of failure can be then and there detected and, with the facile manipulation of collodion, at once remedied. To any practical photographer acquainted with the extreme variableness of the actinic forces, this one advantage should decide the question; but it will be found that to persons working at any distance from home, even the supposed superiority in portability is absent; for though not actually employed at the moment of taking the picture, the inevitable bath and chemicals—like "Sinbad's Old Man of the Sea"—must accompany them upon their peregrinations. Then comes the evening with its bother and mess of developing the pictures

taken during the day, and preparations for the next—preparations which, if they take place in an inn, can hardly fail to figure conspicuously in the morning's *little* account, no matter how carefully precautions may have been taken to avoid stains. Lastly, when it is considered that the photographer has most probably been on "the tramp" since morning, one can picture a more congenial after-dinner employment than a recurrence to chemistry; nor can we wonder should the tired pedestrian entertain strong views upon "the early closing question."—*Irish Metropolitan Magazine.*

Photographic Notes and Queries.

REMEDY FOR THE MARBLINGS AND WATER-MARKS IN FOTHERGILL'S PROCESS.

Sir,—I have only recently been made acquainted with a modification of the Fothergill process, by which the general complaint of marbling and markings like those of watered silk on the negatives, is entirely obviated. In fact, the improvement is more than a modification, for it pursues a different system, based on different principles. You must not wash the free nitrate from the plate, either with four drachms or any other quantity of water, and the dilute albumen is removed by one washing only with one pint of water, though more may be employed at pleasure. Thus the minute and fastidious nicety so generally prescribed in these respects need no longer trouble those who practise the process.

The principal feature of the improved method consists in this—that after the plate has been sensitised, it is placed on a levelling stand, and the surface covered with a sufficient quantity of white sugar syrup, made by dissolving the best white sugar in distilled water quite hot, in the proportion of one ounce of sugar to one of water. To prevent the sugar crystallising, the solution can be placed on the fire till it boils. It must then be instantly removed, and set aside to cool.

It is important that the surface of the plate should be covered at once with the syrup, and of still greater importance that it should be kept unmoved and undisturbed for at least one minute. After this, tilt the plate so as to move the syrup to and fro six or eight times, then pour off and drain. Syrup which has been used for one plate must not be employed again for another.

Place the plate on the levelling stand after draining, and cover it with half an ounce of the following albumen mixture:—

White of egg	1 ounce.
Liquor Ammoniæ	5 minims.
Distilled water	3 ounces.

Shake up in a bottle, and leave to stand twelve hours, then filter. No frothing necessary.

This should be left on one minute, or while another plate is coated and sensitised. Then move it about the plate, pour off, drain, and finally wash by pouring on the surface one pint of water from a jug—more water may be used, if deemed necessary. Set up the plate to dry in the usual way.

Exposure, the same as in Fothergill's process.

Develop with six parts of the ordinary pyrogallic developer, one grain to the ounce, mixed with one part of a saturated solution of gallic acid in distilled water. To half an ounce of this for a stereo. plate, add three drops of a 30 grain solution of nitrate of silver. If necessary, strengthen with more silver. Fix with hypo. or cyanide.

Such is this new process—simple in its manipulation, and perfect in its results. During the last month, nine batches of plates have been prepared by it, and exposed, without a single failure that could be attributed to the process itself; the negatives being remarkable for their clean and clear appearance, without markings, marblings, or any other defect. The negatives are not so dense as usual, but have a greenish hue, which, in printing, makes up for apparent want of intensity.

There have been so many letters of complaint against the Fothergill process of late in the various photographic journals, that I am induced to send this to you at once, and trust that it will be tried by all those who are dissatisfied with Fothergill's, or other methods. Doubtless, the mode now communicated may be susceptible of improvement, but I give it as I received it, and will only add that the author will shortly publish it in detail, with his name, so that photographers will know to whom they are indebted for this simple but valuable discovery. An Amateur.

STEREOGRAPHY.

Sir,—In taking pictures by the ordinary stereoscopic camera, on plates 6¾ × 3¼, about ⅝ inch at each end of the plate is left waste.

I wish to know whether, if I have a camera made so that the picture is taken up to the very edge, when the prints are trimmed down to the ordinary stereo. size, the same part of the object will *appear in the centre of the picture*, or whether there will be ⅝ inch difference?

If, as is now done, the object be focused so that the same part be in the centre of the ground glass, in the two positions of the camera, there would, of course, on trimming, be the difference of ⅝ inch. The point to be considered, then, is, whether by focusing so that the same point of the image falls on *any other particular point* of the ground glass in the two positions; when trimmed, the picture will be fit for the stereoscope, without *separating the two pictures*; so that the only trimming required is at the ends, and, if so, where on the ground glass are such points?

I presume that, in taking one picture, the point of the object must fall ⅝ inch to right, and in taking next, ⅝ inch to left of centre of focusing screen. Is this so?

My object in making the inquiry is this:—I frequently require single pictures for scrap books, albums, &c.

As I take the negative now, the size of these is 2¾ × 3¼, but by the alteration I should get them 3⅜ × 3¼, a difference of some importance. This question becomes of more interest to me, as I contemplate getting an enlarging camera, when the extra ⅝ inch would be very important. D. H.

Pembroke College, Cambridge.

[We presume from the above that our correspondent employs a stereoscopic camera with only one lens, and that the position of the camera is changed for each picture. The lens employed seems also to be capable of covering a rather larger field than is necessary for a stereoscopic slide of the ordinary size, and it is naturally wished to take one, at least, of the twin pictures of the full size the lens will cover. We do not think this can be effected, and the print be suitable for viewing in the stereoscope when trimmed at the edges only (*i.e.*, without diminishing their distance apart by ⅝ of an inch, or some such quantity), unless the parallelism of the axis of the lens in the two positions is interfered with; and this we think injudicious, as optical errors would be introduced into the pictures. The best plan will be to so arrange the position of the plate when the first picture is taken that the full power of the lens is utilised, and then to take the second picture of no larger a size than is required for stereoscopic purposes, and as near the centre of the plate as will be practicable without encroaching on the first picture. In mounting the resulting prints for the stereoscope, the larger one must be pared down to suit the smaller one. It will be always understood that the larger picture must not encroach so much on the plate that insufficient space is left for the proper taking of the second picture.—Ed.]

THE FOTHERGILL PROCESS.

Sir,—Much diversity of opinion appears to exist among photographers as to the best *dry* process; I have only tried the metagelatine and Fothergill's plan, therefore do not feel qualified to give a *decided* opinion on the "vexed" point, but I would gladly give my experience of a third trial of the latter.

On the first week of last month I prepared six dozen stereo. plates, and on the 18th started on a ten days' photographic tour to Warwickshire, the Wye, &c.,—accompanied by an esteemed friend, who, like myself, is rather an enthusiast in the art.

The weather, during our trip, was "good, bad, and indifferent;" but, notwithstanding, I contrived to expose all the six dozen plates before returning home, and I have just completed the developing of the last, four weeks after exposure.

Out of the lot I have obtained five dozen excellent negatives; and those that have proved failures, have so turned out from over or under exposure, or carelessness in the manipulation. Nevertheless, I do think that a process capable of yielding so many good negatives, under manipulation of an inexperienced hand, may well be considered one of the best, if not *the* best; for, even with the wet process, and manipulated by an experienced photographer, I suspect it rarely happens that more than five dozen good plates out of six can be obtained. A. N.

Highbury New Park.

REMEDY FOR A FOGGY BATH.

Sir,—I constantly see in the "News," and other journals of the kind, inquiries how to recover a silver bath that has acquired fogging properties. I have just recovered a bath from the worst state I have ever seen one in, to give one of the brightest positive pictures that has ever come under my notice. I had been trying experiments, and had used it for gelatine, honey, gum, raspberry syrup, paper, and I hardly know what did not go into it. When I had done, I thought, well, now I will try a collodion plate in it; the result was as might be expected. Scarcely (after a prolonged exposure), on being held up to the light after developing, was any picture visible, and to look down upon its surface it looked like a piece of whity-brown paper laid on the glass rather than collodion; now was the time to try the effect of "sunning." I put it out in the full sunlight for an hour, carried it back to my dark room till the morrow, when I tried it again, and I got a plate not a whit improved; on filtering, I found a large quantity of black precipitate on the paper; I had about three pints of bath, and, of course, did not want to lose it. I then put into it about a small teaspoonful of carbonate of soda, let it stand till the next day, when I filtered it, and added acetic acid for a positive bath, and the result is, as I have before stated, the cleanest and brightest blacks in the shadows I have ever seen.

Thomas Warwick.

PHOTOGRAPHY AND GARDENING.

Sir,—Will any of your scientific readers, who are well up in gardening, kindly inform me (and I think it would be a useful bit of information to many photographers if it were to come through the "News") whether the water from the developing sink—which has in my case a conglomeration of most of the chemicals used in photography—is likely to be injurious or beneficial if used to water a garden? or whether, if thrown in one particular spot, it would injure fruit-trees, vines, or flowers, in the immediate vicinity?

F. W. Evans.

ANSWERS TO MINOR QUERIES.

Feebleness of the Image.—*J. F. S.* This may be caused, according to Mr. Hardwich, by the use of impure nitrate of silver, or the presence of nitric acid in the bath; also by over-exposure in the camera. In hot weather the plate must not be kept too long before dipping, or between sensitising and development, otherwise the film will become partially dry, and a loss of density will result. Another cause of weakness of the image is an improper mode of applying the developer, viz., scattering too large a quantity over the film, so as to wash off the greater part of the nitrate of silver. The density of the negative will also vary much with atmospheric conditions imperfectly understood, the same collodion giving sometimes a weak and sometimes a strong picture.

Strength of the Negative Bath.—*Tapping.* The strength of bath which seems to be universally adopted in England is 30 grains to the ounce. For our own part, we think it might very advantageously be increased to 40 or 45 grains. We have worked with much satisfaction in a bath of this strength; and our American brethren in the art strongly urge the advantage of a 40-grain over a 30-grain bath.

TO CORRESPONDENTS.

J. Morel.—1. A twin lens camera is the one we prefer for general stereoscopic work. 2. No lenses have yet been made, of that kind, small enough for stereoscopic pictures.

H. M. G.—1, 2, 3. We do not recommend the addition of iodine to a silver bath. A few grains of iodide of potassium may be added to a new bath, if it eats away the sensitive film; but this effect soon goes off after preparing a few plates in it. 4. If you send word to our publishers they will forward the missing numbers of the "Photographic News."

J. D.—In order to remedy the red tone of print 1, print deeper, and keep it a longer time in the toning bath; this, provided your chloride of gold is good, will produce darker colours. The absence of half-tone in the face of print 2 is (provided the negative is a good one) caused by the salts of gold and platinum being acid; they should be made alkaline, according to the directions given by Mr. A. Watt and others in recent numbers of the "Photographic News."

A Beginner.—Any good negative collodion will take pictures in less than half a second in sunshine, provided the lens be tolerably quick working, and the chemicals are in good order. The varnish to be used for painted photographs entirely depends upon the kind of colours used, whether powder, oil, or water colours; if you ask at the colour shops, they will recommend you the best kind for your purpose, their preparation being a trade secret. Water colours may be made to adhere to albumenised paper by adding a little prepared ox-gall to the water in which the colour is rubbed.

F. J. B.—1. The yellow stains caused by nitric acid on the fingers cannot be removed except by friction with pumice stone, or other means by which the burnt skin is worn away. 2. We have not yet tried any experiments with the "moulded carbon" filters, but should think that they would do for filtering rain water for photographic purposes.

A Voice Outside.—We cannot imagine any one, who is really desirous of profiting by the paper alluded to, being unable to understand the few mathematical expressions used. You must remember that in studying any science you must learn the *correct language* of that science. It is unfair to our other readers to ask us to translate all our scientific articles into such elementary language as to be understood by those who have not hitherto paid any attention to the subject. Tell us *where* you find a difficulty in comprehending the description, and we will gladly assist you; but so long as your complaint is an indefinite, sweeping one of "can't understand," what can we do?

S. W.—Keep on distilling the water, throwing the product away at first, when an ounce or two comes over, and testing the successive portions with nitrate of silver. The water will gradually come over purer and purer, and when it shows itself quite pure, collect it for use. The impurity of the first portions is caused by the different parts of the apparatus not being perfectly clean when first used.

W. B. R.—If the names and addresses were printed as you suggest, they would occupy more space in our columns than we can afford to give. If, however, we can see a way of getting over the inconvenience you name, we will adopt it.

Enquirer.—All depends upon the materials of which the paint is composed. No injury will be caused by it so long as none of it comes off visibly on to the prints.

Spx.—Employ a single meniscus lens, and after focusing, push it in so as to diminish the focal length by about one-thirtieth of its entire distance. The convex side of the lens must be next the focusing screen.

F. H., Stockwell.—Received.

Old Subscriber, should have been an *old reader* likewise, as he would then have seen that no subject has been more fully treated of in our columns than the methods of recovering silver from various solutions.

Folly.—Turn your lens round, and the imperfections in your pictures will vanish; you have in some way managed to reverse it in the mounting.

A Young One.—We did not give a diagram of the invisible actinic rays, but we propose to do so in a future article specially devoted to the subject.

Wax.—The formula given in our last by Mr. Stanley Crawford, will be applicable for work during very hot weather in this climate.

J. C. S.—We are not partial to fixing with cyanide of potassium; it is so energetic a solvent that it is very liable to dissolve some of the picture and produce faint negatives. Quite as much washing is required as when hyposulphite is used.

H. O. W.—The wire should be soldered together at the upper part, so that the metal used as solder may not injure the bath. It would be as well, also, if it were electro-plated at the join.

Colour.—Consult our advertising columns.

S. T. O. R.—The gas was sulphuretted hydrogen, or hydrosulphuric acid; a very deleterious and offensive body. We are not surprised that your family objected to your employing it in the drawing room.

Colla.—If the iodide of silver separates from the plate and floats about the bath in yellow flakes, it is a sign that the collodion is over-iodised. The remedy is obvious.

Old P.—The lens which you have been using is not large enough for such work; it is unfair to the maker to exhibit such pictures as you have sent us, without some explanation.

Communications declined with thanks.—C. S. Y.—Process.—M. W.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—July.—P. Q. R.—W. L. W.—P. R. P.—F. O.

In Type:—M. A. Root.—G. H. W.—J. Walter.—W. L.—W. H. B.—E. Garrod.—I. W. W.—F. Debenham.—J. S. Overton.—G. R.—Knostian.—One in the North.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 50.—*August* 19, 1859.

THE TURPENTINE WAXED PAPER PROCESS.

MANY inquiries having been made for information on this process, we think that we shall best meet the wishes of our readers, if we lay before them the process which has been largely employed during the past year by our friend the Rev. J. Lawson Sisson. The process itself is founded upon that of M. Tillard, and the following abstract is taken from an excellent little work* on this and similar processes, which the above-named gentleman has written, and illustrated with some of his beautiful waxed paper stereograms.

Dissolve, by moderate heat, one ounce of pure white wax in twenty ounces by weight of the ordinary spirits of turpentine. Let it rest for twelve hours, and then filter. Add carefully, and by degrees, to the filtered liquid, two drachms of pure iodine. The mixture produces ebullition, and is at first of a reddish colour, which shortly changes to that of a weak solution of chloride of gold.

To this preparation next add two ounces by weight of cold-drawn castor-oil. Mix well.

Pour this solution into a flat porcelain dish, scrupulously clean and dry, and in it immerse your negative paper, cut to a convenient size, for three or four minutes, taking care not to place too many sheets at a time in the liquid, and avoiding the formation of air-bubbles.

The paper becomes transparent, and like parchment in tenacity. Remove the paper sheet by sheet, and hang up to dry in the usual way; when dry, place the paper between the leaves of a portfolio, where it will keep well for some time. The liquid will serve until it is exhausted to iodise fresh paper.

Paper thus easily prepared, and sensitised in an aceto-nitrate of silver bath, gives very good results indeed—the negatives being very transparent in the lights, and of an intense black in the sky and the other dark portions; but the time of exposure is as long as with the ordinary wax paper process. By submitting the paper, however, to a second process, as indicated by M. Tillard to the French Photographic Society last year, it is rendered much more sensitive, and is well worth the additional trouble bestowed upon it in iodising it a second time. I have taken a good portrait, in mid-winter, in half a minute with paper thus iodised a second time. Here is the process:—

Serum of milk, 18 fluid ounces; dissolve it in iodide of potassium, 3 drachms; bromide of potassium, 2 scruples; add to the above the whites of 5 eggs, beaten to froth; then beat all the ingredients well together; let the mixture rest for some little time; filter through fine muslin (double) into a flat porcelain dish; plunge sheet upon sheet of the paper, *previously iodised* and *quite dry*, into this second bath, avoiding the smallest bubbles of air between the sheets; leave them in this bath at least 15 minutes—longer iodising does no harm—remove one by one, and pin up to dry, placing a morsel of white blotting paper at the lower corner to hasten the drying; preserve it in a dry place between blotting paper.

Sensitising the paper is the next operation, which must be done by the light of a taper in the dark operating rooms.

The bath is composed thus:—Nitrate of silver, 20 grains; lemon juice, 8 drops; acetic acid, half a drachm; distilled water, 1 ounce; iodide of potassium, half a grain.

A sufficient quantity of this may be made to last some time; it improves with keeping; it must not be exposed at any time to daylight.

M. Tillard plunges his paper into a bath, prepared in the manner stated above, for four minutes. I invariably sensitise it upon a glass plate set level.

Clean the glass thoroughly; set it level; filter on to it a drachm or two (according to the size of the paper) of the aceto-nitrate solution; spread it with a bit of wax paper; place the smoothest side of the paper, which ought to have been marked at first, carefully on the liquid; leave it there until the upper side has almost lost its pinkish-yellow tinge; then reverse the sheet, leaving it in contact with the silver solution for about a minute; remove it by one corner with a pair of horn forceps, and wash it well in rain water for some minutes; you can hardly wash it too much; blot off between two fresh sheets of blotting paper, and pin up until all the sheets you are going to prepare are washed. It is necessary to filter a few drops of fresh aceto-nitrate on to the glass plate between the sensitising of each of the papers, and when all are sensitised, pour off the remaining liquid into a bottle containing a solution of common salt. All the silver falls to the bottom as chloride of silver; and when sufficient is obtained to make it worth while, you can reduce the chloride to the metallic state in the ordinary way. Very little silver is lost, and you have a fresh sensitising solution for every sheet of paper, and there is no need of kaolin or animal black. I prefer this mode very much to the usual one of employing the bath over and over again; but if you prefer using a bath, then you must add some kaolin to preserve the solution clear, otherwise the albumen in the second iodising bath would soon discolour it. The papers are now ready for placing in the dark slides of the camera.

It is impossible to give any positive directions as to the time of exposure in the camera. From some experiments I have lately made, the turpentine paper seems to be at least one-third more sensitive than the ordinary wax paper. As the paper bears, without injury, a prolonged action of the developing bath, it is well to avoid over exposure.

The paper will keep well many hours after exposure in the camera, and before developing. I have developed some negatives the day after, but, although this is sometimes exceedingly convenient, I would by no means recommend it as a rule. I would especially enforce the necessity of having the developing dishes thoroughly clean. Notwithstanding the bad name that cyanide of potassium has got, I always make use of it to clean my dishes and hands. Into a *perfectly clean* dish, then, pour equal portions of saturated solution of gallic acid in rain water, and rain water (it is important not to have the gallic acid stronger than this). Add five or six drops of the sensitising silver solution described above to every four ounces of the bath; the silver solution must not have served for sensitising. I usually let the negatives float on this developing bath, exposed side in contact with it, for a few minutes, until the paper lies flat, and the image has begun to appear. Then, by means of a triangle made of a thin glass rod, push the paper under the solution. There is some little difficulty in keeping the turpentine paper under the solution; its pores are so cemented together by the turpentine and oil, that it is not easily saturated with the solution, and, consequently, will float; it must, therefore, be watched. The glass triangles are excellent tools in photography. The Vicomte Vigier employs them for spreading the sensitising and developing solutions

* Published by Marion and Co., Regent Street, W.

over the paper in the Talbotype process. They are most useful in iodising wax paper; with two of them you can push the paper under the solution with the greatest ease, holding the paper with one of them at one corner, while with the other you chase away every air-bubble by rolling, as it were, the base of the triangle over the length and breadth of the paper.

The development is continued until the sky is intensely black, for the hyposulphite bath and the after waxing much reduce the intensity of the negative. The paper sometimes acquires a dirty yellow colour in the bath; no attention need be paid to that. Some of the best negatives are of this colour; they print as well as the others. Sometimes, when I feared the exposure had not been sufficient, I have tried, and with great success, the following methed of development: pour into a flat-bottomed dish just enough of the following solution to cover it:—Distilled water, 1 ounce; pyrogallic acid, 2 grains; aceto-nitrate of silver, 2 drops.

Float the negative until the picture begins to appear; remove it carefully; let it drip for a moment, and then place it on the gallic acid bath as above. When the picture is fully developed, the blacks are beautifully dense. In both cases, when all the details are quite out, and the sky sufficiently dense, wash the picture in common water, changed twice, and then plunge into a freshly made bath of hyposulphite of soda of usual strength, say—Hyposulphite of soda, 1 ounce; rain water, 8 ounces.

Let it remain no longer than is just sufficient to dissolve out all the yellow iodide of silver. After that, wash it well in several changes of water, for two or three hours, at least, and blot off with clean blotting paper, and hang up to dry. When *thoroughly dry*, it is ready for waxing; with the turpentine paper this is very easy, for it instantly imbibes the melted wax. Remove the excess of wax by ironing between some clean sheets of blotting paper, taking especial care that the iron is not too hot. The picture is then finished; and, if ordinary care has been bestowed upon the various operations, the amateur will be rewarded with a splendid negative, having the appearance of a fine Talbotype, rather than that of a wax paper negative.

Remarks on the above process.—It is well to avoid leaving the paper too long on the sensitising solution, as it occasionally gives a spotty appearance to it.

Too much silver in the gallic acid bath injures the negatives, by causing a dingy appearance in the lights. The negative, examined by a magnifying glass, appears covered with little black filaments. This is often seen in wax paper negatives, and would seem to be fibres of the paper, charred, as it were, by too strong a solution of nitrate of silver.

M. Tillard, as well as Sir William Newton, recommends a little camphor to be added to the gallic acid solution. M. Tillard also adds it to the iodised turpentine bath. I am inclined to think it helps to keep the lights clean.

Gutta-percha baths must, on no account, be employed for the turpentine solution, nor for the developing baths.

It is an advantage for the traveller to be able to use a sheet of glass to sensitise the paper upon. The Rev. Mr. Raven recommends the tourist to take with him a second piece of ground focussing glass, in case of accident. This ground glass answers excellently; the solution does not so easily run off; the glass is easily cleaned by washing well, and rubbing dry with "papier Joseph."

For developing, the best dish is a solid glass one; the extra expense is more than repaid by the assurance the photographer feels of having always a dish which he can easily and thoroughly clean, and which cannot imbibe any deleterious agents.

For greater security in changing the papers in the open air, I employ a black cotton-velvet bag, lined with yellow calico, the ends of which have a strong vulcanised india-rubber ring running loosely in a hem, so as to close tight round the wrist. In this I can change either papers or dry collodion plates.

NEW CHEMICAL BALANCE.

BY MR. J. B. COOKE, OF LIVERPOOL.

Our contemporary, the *Mechanics' Magazine*, contains the following description of a new chemical balance. Accurate weighing has been frequently spoken of in our pages as being of such importance to the experimental photographer, that we are induced to extract for the benefit of our readers the following excellent description of this simple piece of apparatus:—

"The balance is an instrument of prime necessity to the exactitude of the results sought for in the operations of the chemist. But it is also a very expensive piece of apparatus, and its delicacy requires it to be guarded with the utmost care from the effects of damp, and the other vapours and fumes incidental to a laboratory. The following is the description of an instrument which has been in constant use for more than a year, and which is at once sensitive, effective, inexpensive, and not liable to injury. It weighs quantities amounting to 2,400 grains with an accuracy unmistakably distinct to the $\frac{1}{100}$th of a grain.

"Though freely exposed to an atmosphere which in twelve hours covers a polished iron surface with rust, and which is often loaded with fumes of hydrosulphuric and other acids, it is now as sensitive as on the day of its construction.

"The materials of which this balance is composed are to be found in every laboratory. Their first cost need not amount to 5s., and they can be put together by the chemist himself in the course of two or three hours, so as to be in perfect working order.

"To those operators whose object is the attainment of accuracy with the smallest expenditure of means, it is hoped that a desideratum is here supplied, although some of the points usually considered essential to a good balance appear to be disregarded.

"The beam is formed of glass tube. A piece of barometer tubing of 12 or 18 inches in length, or even the full length of a barometer tube, if economy of space is not important, may be employed. Another glass tube of about three inches in length, and of diameter and thickness proportioned to the weight it is destined to bear, is attached to the beam tube at right angles, at about the middle point of each. Exactitude in any of these particulars is not essential. The attachment may be made by any convenient means, say by fine iron wire, covered afterwards with sealing-wax melted on to it.

"If a portable balance be desired, a suitable stand must, of course, be provided; but if the instrument be intended to occupy a permanent position, it may be made to work upon an open shelf, and the present description applies to the latter circumstances.

"Two other glass tubes, of about two inches in length, are cemented longitudinally upon the surface of the shelf, parallel to and at a distance of 1½ inches from each other.

"They must be equal to each other in diameter, which must be greater than that of the beam tube, or they must be raised equally to some small distance above the surface of the shelf, so that, when the transverse tube attached to the beam is placed across and upon them, the beam itself, lying between and parallel to them, shall be raised at its centre at least ¼-inch above the shelf. The three small tubes should be selected of good shape and polish.

"By this arrangement the beam, when in equilibrium, is supported upon two points, which, owing to the roundness, smoothness, hardness, and chemical inertness of the material, approximate closely to mathematical points not liable to injury from oxidation or friction. Knife-edges, working upon planes of whatever substance, are not theoretically so perfect in action as the above *points* of support, and it would be difficult with the finest art to make them practically more sensitive.

"A piece of sheet-copper is fastened on to the shelf under the beam near each of its ends. An edge of each piece of copper running transversely to the shelf is turned up at right

angles to serve as a support at such a height that when one end of the beam, loaded with its full weight, is resting upon one of them, the other end may be separated from its resting place by about $\frac{1}{50}$th of an inch. If the under-surface of the beam be blackened about these places of support, the separation shows very distinctly against a white surface placed behind.

"The weights, and substances to be weighed, are both applied at the same end of the beam; the other end being compensated by a constant counterpoise; a peculiar form of scale pan is therefore required. It is convenient to have three tiers of pans hung in a pyramidal form at a suitable distance from each other by the same three silk strings. The largest and lowest is destined for the substance to be weighed; the middle one in size and position for the larger weights; and the smallest and uppermost pan contains the weights below 10 grains. This compound scale pan is suspended by a bent wire to a loop formed at one end of a short silk thread, which, passing vertically through a small hole in the shelf, and bisecting the end-section of the beam tube, is cemented with sealing wax on the upper surface of the tube. The thread should lie in a slight notch filed on the upper circumference of the end of the beam, and should hang freely from it, the lower circumference being ground away to prevent contact. The thread must also, of course, be carefully protected against contact with the sides of the opening in the shelf. The better way is to make an opening of about one inch square through the wood, and afterwards to cover over the greater portion by four slips of window-glass crossing each other, and leaving only a small hole in the centre for the thread. If this opening be large, the balance will be affected by currents of air which always occur upwards or downwards in such circumstances. The surface of the shelf between the centre of the beam and that end of it to which the pans are hung is divided into ten equal parts by ink lines; and a platinum rider weighing $\frac{1}{10}$th grain is applied to this arm of the beam, and by traversing over each division marked on the shelf causes the variation of $\frac{1}{100}$th of a grain, and dispenses with the use of weights smaller than $\frac{1}{10}$th grain.

"The sensitiveness of a balance is proportional to the approximation to each other of the centres of suspension and of gravity. In the present instance, the centre of suspension is the central point of the mid-section of the small tube attached to the beam, and since the weights of the beam itself and of the scale pans and their contents, are referred to a point much below this, some provision is required by which the centre of gravity of the whole mass may be considerably raised, and its position nicely regulated. The provision required is found in the mode by which the compensation is applied at the end of the beam destitute of scale-pan.

"On the upper side of the compensation-end of the beam is cemented horizontally, with shellac, a table of window-glass of about 1 inch square surface. On this table again are cemented, by the same means, in vertical juxtaposition, two glass tubes; one about 3 inches high and $\frac{1}{4}$-inch in diameter, the other 1 inch high and $\frac{3}{4}$-inch in diameter. A quantity of dry pure mercury is then poured into the tall tube until the beam, whose scale-pan is loaded with about $\frac{2}{3}$rds the weight which it is destined to carry, is nearly in a state of equilibrium. If the tall tube be sufficiently high and narrow, it will then be found that the centre of gravity has risen above the centre of suspension, as will be evidenced by the setting of the beam at either end indifferently accordingly as it is placed.

"Mercury is now poured gradually into the shorter tube, and after each addition weights are added in the scale-pans to produce equilibrium. By every such addition the centre of gravity will be proportionably lowered, and may be brought with the utmost nicety within any assignable distance from the centre of suspension.

"The adjustment will suffice for the purpose of the balance, when the transference of the rider over one division of the shelf towards the centre of the beam shall raise this end of the beam from its supports, and the replacing of the rider in its former position shall restore the preponderance of the weights, and when on frequent trial this is the invariable result.

"The balance is thus left with an extremely small amount of overpoise. The substance to be weighed is placed in the lowest pan. Weights are removed from the upper pans, and ultimately the rider is moved over the arm towards the centre, to the point at which the beam is first caused permanently to resume its normal position. The sum of the weights removed, together with the number of degrees passed over by the rider reckoned as $\frac{1}{100}$th of a grain, will be the weight required.

"The advantages claimed for this balance are, easy construction, cheapness, non-liability to injury from exposure or rough handling, the whole operation of weighing being confined to one end of the beam without loss of sensitiveness, and the separation of the large from the smaller weights.

" . . . . . . The method of mounting is not inferior in sensitiveness to that of the best constructed instruments; and the limits of its sensitiveness are far from being reached in the specimen above described. As an illustration of this assertion, the following rough experiment is adduced:—The writer constructed a balance, of which the beam was a tube of thick glass 22 inches long, and 1 inch in external diameter, and weighing alone $1\frac{3}{4}$ pound. The scale-pan was loaded with a weight of 1 pound. The compensation was then readily effected with mercury to such accuracy that the translation of a platinum rider weighing $\frac{1}{10}$th grain along the beam, over a space equal to $\frac{1}{10}$th of the length of the arm, sufficed to change the preponderance in favour of the one arm or the other, according to the direction of its transference. This roughly-formed balance therefore, which, exclusive of the scale-pan, did not occupy two hours in construction and preparation for use, was sensitive to a weight of $\frac{1}{100}$th of a grain, or to $\frac{1}{700000}$th part of the weight to be estimated, and about $\frac{1}{2000000}$th part of the whole weight supported on the fulcrum."

PAPER v. COLLODION.

I AM glad to see a kind of "revival" as to the practice of some of the paper processes making its appearance in sundry questions and "answers to correspondents" in all the journals connected with our art. It will, doubtless, be looked upon as a question long since decided as to the merits, or rather as it is deemed *inferiority*, of anything in comparison with *wet collodion;* yet, if a man is not totally blinded by prejudice, he must allow the fact, that to work collodion on a trip is almost making a toil of what should be a pleasure, and that if he cannot take his *van* with him, a *tent* requires almost as much assistance, and is often almost useless. But as to beauty—setting aside the question of convenience—the collodion men will say that all must admit their higher claim. Far from it, I reply; in pictures larger than 12 × 10, or, at all events, not less than this size, the texture of the paper gives a boldness and artistic effect, in comparison with which a *large collodion* picture is dead and flat to a degree. I have compared some Welsh scenery taken on collodion with pictures taken on paper, and it is undeniable that the paper work excels the glass in all those points where photography fails as to artistic effects. Not that it can be so stated as to every kind of picture. To be in the highest degree successful with paper the picture should be more what may be called a "study" than a "panorama"—something requiring texture and massive boldness. Bedford's exquisite pictures seem to be chosen with reference to the process he works; sharpness, minuteness, and position are all irreproachable. Turner's calotypes are, however, no less beautiful—his old oaks and cottages are far bolder than anything from collodion; broad shadows, which give a massive look to the trunks and architecture, and a stereoscopic effect which few, very few, collodion pictures have. The difference seems to me to be, that the collodion subjects are intended to be kept

in a portfolio, and the large paper productions are far more fit to be framed and hung on the walls.

I know that many will not agree with me in this statement, yet others will deem this none too great praise toward the paper works; and, in support of this opinion, I will but state that in some of our largest exhibitions the prizes have been awarded to pictures taken originally on paper. But what is it, then, asks the novice, that makes the glass processes alone used, or nearly so? The old cry of poor negative paper is then repeated, and some of these difficulties are the following:—Of late there have been many enquiries as to the cause of calotype paper staining on the back. Some have answered, that it is bad manipulation, but this is not so, as some of the most successful operators find this annoying failure so very frequent that they have totally given up this process. Amongst many, I am one who has met with this mischance, and amongst many, I am now changing my process for this cause alone. Perhaps my results from calotype are as *photographically* good as any operator's. I have scores of pictures which very few would be able to distinguish from glass prints, and the half tones are as fine or finer than collodion itself. Has my manipulation, then, failed so suddenly? My belief is this—the new paper has some different preparation of *size* upon it which, in iodizing, is partially dissolved away. Some sheets are, indeed, rendered so tender during development, that they will not bear even their own weight, and are truly reduced to blotting-paper.

As a remedy for this, I tried albumenizing the paper, and this removes much or all of the annoyance; but I always look upon the paper as more doubtful in its keeping and working properties. But ere long I gradually changed my process to the waxed-paper, and I am now using this process only. Paper is easily procured, and the long, troublesome work of *waxing* is reduced to a few minutes' certainty by steeping the sheets in the turpentine-wax mixture usually recommended. The results from this process are very sharp and well brought out in light and shade, and many advantages arise from its use. The sheets keep a week at least, so that if a man goes three or four days' trip to some beautiful ruin, he has no work until he returns; and in certainty nothing exceeds it. Yet there is one difficulty, and that is the *cleanliness* required—it must be utterly irreproachable, else those annoying "marblings" show in developing, and ruin an otherwise beautiful picture.

In this process I think porcelain dishes are almost necessary, as gutta-percha or other substances are so very difficult to keep clean; but, in looking into the prices of these, the operator will be quite cast down by the exorbitant cost of the very large sizes; for months I refused to give this price, and went on working with home-made articles, but a week or ten days since I happened to enter the shop of an agent for a French house, and there, to my delight, I found beautiful dishes—far flatter and better made than any English I had seen—and the price was 5s. 6d. for what I had always been asked from 12s. to 20s., according to the place inquired at. How long will these houses be their own enemies? What is usually termed a "round-of-beef dish," of the common "willow pattern," costs from 1s. to 2s., and this with all the trouble of printing, &c. A photographic dish of the same size without printing, and certainly less troublesome to make, costs from 15s. to 20s. On inquiry, I was told that *flat things were always expensive*. I reply, not one photographic dish in fifty is nearly so flat as the common household dishes. If they are made of a more expensive clay, the difference cannot be so great; and if the quantity required is small, a lower price would remove much of that, and hundreds would be used where such a thing is never seen.

In conclusion, my belief is, that the finest quantity of photographs which could be gathered would be composed of about equal parts of glass and paper productions, and that the last mentioned will one day prove the more useful servant.

Θ

AUSTRALIAN NATURE—AND THE ART OF THE PHOTOGRAPHER.*

THINKING as we do, that photography will be also of especial advantage to descriptive (systematic) natural history, a use yet hardly attempted, we shall apply this axiom first to our present subject. It was Professor Lichtenstein, of Berlin, we think, who, in his travels in the Cape, first gave an engraving of a group of ostriches roaming in the deserts of that country—a sight most characteristic, and as well executed as it could be, except by a first-rate artist, or by the aid of photography. For who else can imitate that originality of nature in all its productions, that great type and character which pervade all works of creation? and, then, men like Redouté, or Francis Bauer, or Audubon, are scarce, as it pays better to paint some unmeaning pageant, than the grandeur and sublimity of nature.

Having mentioned the last-named gentleman (an American, but who had been in England), we have arrived at the *ne plus ultra* of the painters of nature. Speaking from memory, we should say that some of his plates of American birds must be nearly 40 inches long—and of such there are several volumes—and still, this stupendous work appeared merely supported by subscriptions of private individuals in America and in England. It is touching to read, as Mr. Audubon states in his preface, how, travelling in some place or other of the backwoods of America, he obtained—a subscriber! As photographic plates are even now attainable up to the size of 36 inches square, there is scope for more Audubons, and at less expense. Moreover, we have to consider that there is an extensive movement going on for popular instruction and recreation; rich people seem to die only for the purpose of leaving immense sums for popular establishments; museums, town-halls, crystal palaces, botanical gardens are springing up everywhere. And all these places have, at least, their entrance halls, corridors, &c., the walls of which are to be adorned by all that is worthy, fair, and pleasing.

Returning once more to purely Australian subjects, we may remark, that it is the aboriginal *men* of that country who first arrest our attention—the South-Sea negro, the Papuan. They stand at the confines of *animality*, as they are found living in pairs under the rock shelves near Lake Macquarrie. We do not believe that there exists one adequate delineation of this race, of which certain types, belonging to certain localities, are dying out. But here an especial law comes into operation, namely:—not to represent scenes from nature taken at random, but subjects selected with tact and judgment. The Australian aborigines are, perhaps, the most varied and changing of any race we know—they range from the stately, erect, plump, and strong, to the very prototype of a living and walking skeleton. Here, as in most cases, the artist must become a student, and make such a selection as will represent either the Papuan of one or the other district, or a general type of the whole race, so far as accessible to the travelling artist. But in the delineation (reproduction) of the naked or half naked races of men, nothing but heliography will yield any satisfactory result; and it might seem that the bard of Avon had something analogous in view, in writing that splendid and world-known line—

"To hold, as 'twere, the *mirror* up to Nature."

It is only heliography which will ever produce plates in which the exact proportions of the osseous and muscular parts, the tension or relaxation of the skin, the gloss of the body, and the whole gait *(portamento)* will appear in a manner to afford instruction to the anatomist and ethnographer. By such pictures, also (we mean large plates), the physiognomy of the different tribes of men will be best illustrated, and that axiom be made apparent, that humanity is everywhere fair and handsome.

Passing from man to the higher animals *(mammals)*,

* Continued from vol. ii. p. 246.

we may state that huge whales inhabit the shores of the Australian continent, which, perhaps, the camera may seize whilst roaming on the surface of the ocean; at any rate when, still half alive, they are stranded, even near Sydney Head, of a length of 70 feet. And thus it may be truly said of photography, that we hardly stand at the threshold of its destinies and accomplishments. Seals, also, of great variety *(Otaria Perr.)* are to be met with on the rocks bounding the sea, and add to the picturesque appearance of the scenery. Of quadrupeds, properly speaking, Australia has none very large, at least not to be compared with the giants of Asia or Africa. Still, the kangaroo is an exceedingly interesting animal, not to be met with except in New Holland. If we distinguish mammals into quadrupeds and bimana, the kangaroo may be called a triporous animal, as its immense tail, from 4 to 5 feet long, and of immense strength, serves it as a support in its immense jumps, its fore legs being quite small, and, as it were, rudimentary. Nothing can be imagined more sylvan and characteristic of the country, than to see a flock of such animals in some secluded glen of their wild forests, the biggest (called the *old man*) taking the lead, with ears erect, listening to every noise, even that of a falling leaf. Still, they are not over-shy when approached under the wind, and some fine views may be thus secured by the camera. These animals are so popular here, that they, together with the emu (ostrich), have been made the shieldholders of the coats of arms of the province of New South Wales. Of other quadrupeds, there are hardly any in Australia which would claim the attention of the nature-painter or heliographer in a general point of view.

It is different with the feathered tribe—and it is wonderful to reflect on the diversity of hue and colour some of them exhibit. Finding a *take* of them lying on the ground, one might fancy them a heap of flowers. The Australian parrot tribe does not comprehend specimens so large as the South American *Aras;* still the *black* cockatoo, a bird of most grim and lugubrious aspect, and the white and yellow-crested, are of sufficient size to ornament any landscape into which they, especially in large numbers, should be introduced. We have seen, some years ago, a splendid water-colour sketch of a large group of Australian Psittacinæ, made on the spot by Ferdinand Bauer, painter to the Flinders-Brown Expedition, but it has since disappeared under that bane of jobbing in everything, even the highest art works. Although "Gould's Birds of Australia" contain some beautiful plates, yet there is numberless scope left for the collodion process to depict these birds in their natural, wild haunts, surrounded by their native, bizarre localities and scenery. The foregoing observations apply similarly to the two species of ostriches inhabiting Australia, the emu and the cassowary. Depicted as they roam, horselike and proud, over the vast plains of land, they will be also an object of great interest. But the finest bird in the world is probably the Australian *Menura superba*, of the family of the Gallinaceæ, with his tail resembling a huge lyre of Apollo. He is to be found in the glens and gulleys of the wild Blue Mountains west of Sydney—flying and flapping through this primeval thicket! We conclude this notice with the hope that we have stated some facts, as to how the *new* art can be worthily employed in the *new* country.

PHOTOGRAPHIC VISITING CARDS.

The printing of portraits on visiting cards appears to be more commonly practised in Paris than here, at least if we may judge from the following article, which holds a conspicuous position in a recent number of *La Lumière*:—

"The fashion of using photographic visiting cards tends each day to become more general—thanks to the ability which our photographers exhibit in this branch of the art. The public like these charming little portraits, of which they can obtain a hundred for the same sum it would cost them for one large proof. Hence M. E. Delepert has rendered a general service in creating this new branch of photography, for it is, as is no doubt remembered, to this eminent amateur that is owing this clever invention. At present, we have to mention a modification which he has introduced of his primitive idea—a modification by which artists generally will doubtless profit.

"The specimen we have before us at the present moment is composed of a visiting card of the ordinary form and dimensions, bearing the name and address as usual, only above the name, in the place where titled people are sometimes in the habit of having their arms printed, M. Delepert has made the engraver emboss a little frame, inside which the portrait is placed. According to the fancy of the owner of the card and the kind of visit he wishes to pay, it will be easily understood that the expression of the model may be varied to an immense extent."

We presume it is meant that, in paying a visit of condolence, the gentleman might be represented with a lachrymose expression of countenance; in paying a visit to a *sportman* —as the French papers always call a patron of the turf—he would be represented with a cigar in his mouth, and his hat *en tapageur;* while, if he were a photographer and proposed like another wise man of Gotham to go to sea in a bowl, he would, doubtless, represent himself in the position familiar to those who have seen the pictorial illustrations of the voyages of Sinbad at the Polytechnic.

"Morning visits, ceremonial visits, congratulatory, condolatory, return to town, &c. &c., might be expressed photographically under their different forms, and furnish subjects for clever compositions.

"A system of printing which has not yet been employed, and which we heartily recommend to amateurs, is employed by M. Delepert for printing his cards. You get into a carriage with the intention of taking a long drive, or of looking after your business. You drive yourself, as every gentleman ought to do. All this time your servant is sitting with folded arms, which is actually immoral, inasmuch as idleness engenders bad thoughts, which lead to bad actions. Now if, just at the moment you are starting, you put a printing frame into his hands, together with a negative and some sheets of prepared paper, he can, during the journey, profit by the sunshine and the weather to print several proofs without fatiguing or disturbing himself. You thus give a salutary occupation both to his hands and his mind, and develop in him a love of art. Is not this an excellent idea?

"For the rest, M. Delepert, who, in travelling fast and far, has found means of writing many charming pages, full of keen observation, spirit, and humour, knows well how to profit by hours which are generally wasted in a long journey. Thus, his carriage is a laboratory, and he establishes himself so commodiously therein that he prefers it, even when in town, to any other which he has at his disposal. In fact, nothing can be more convenient than a laboratory, the position of which you can vary according to the light, temperature, or kind of work you are engaged upon.

"We have an idea that M. Delepert will allow us, in a future article, to return to the subject of his photographic labours, to give an account of the interesting prints he has taken at the Lariboisière Hospital, which give so exalted an idea of the services which photography may render in its application to medical studies."

Dictionary of Photography.

Fluorescence (*continued*).—"The general appearance some highly 'sensitive' media in the invisible rays then exhibited by means of the flame of sulphur burning in oxygen, a source of these rays which Dr. Faraday, to whose valuable assistance the lecturer was much indebted, had in some preliminary trials found very efficacious. The

chief media used were articles made of glass coloured by uranium, and solutions of quinine, of horse-chestnut bark, and of the seeds of the datura stramonium. A tall cylindrical jar filled with water showed nothing remarkable; but when a solution of horse-chestnut bark was poured in, the descending fluid was strongly luminous. The experiment was varied by means of white paper on which words had been written with a pretty strong solution of sulphate of quinine, an alcoholic solution of the seeds of the datura stramonium, and a purified aqueous solution of horse-chestnut bark. By gas-light the letters were invisible; but by the sulphur light, especially when it had been transmitted through a blue glass, which transmits a much larger proportion of the invisible than of the visible rays, the letters appeared luminous, on a comparatively dark ground. A glass vessel containing a thin sheet of a very weak solution of chromate of potash allowed the letters to be seen as well, or very nearly as well as before, when it was interposed between the eye and the paper; but when it was interposed between the flame and the paper the letters wholly disappeared—the medium being opaque with respect to the rays which caused the letters to be luminous, but transparent with respect to the rays which they emitted.

"It was then remarked what facilities are thus afforded for the study of the invisible rays. When a pure spectrum is once formed, it is as easy to determine the mode of absorption of an absorbing medium with respect to the invisible, as with respect to the visible rays. It is sufficient to interpose the medium in the path of the incident rays, and to notice the effect. Again, the effect of various flames and other sources of light on solutions of quinine, and on similar media, indicates the richness or poverty of those sources with respect to the highly refrangible invisible rays. Thus, the flames of alcohol, of hydrogen, &c., of which the illuminating power is so feeble, were found to be very rich in invisible rays. This was still more the case with a small electric spark, while the spark from a Leyden jar was found to abound in rays of excessively high refrangibility. These highly refrangible rays were stopped by glass, but passed freely through quartz. These results, and others leading to the same conclusion, had induced the lecturer to order a complete train of quartz. A considerable portion of this was finished before the end of last August, and was applied to the examination of the solar spectrum. A spectrum was then obtained extending beyond the visible spectrum, that is, beyond the extreme violet, to a distance at least double that of the formerly known chemical spectrum. This new region was filled with fixed lines like the regions previously known.

"But a spectrum far surpassing this was obtained with the powerful electrical apparatus belonging to the Institution. The voltaic arc from metallic points furnished a spectrum no less than *six or eight times* as long as the visible spectrum. This was, in fact, the spectrum which had already been exhibited in connection with the fundamental experiment. The prisms and lens which the lecturer had been employing in forming the spectrum were actually made of quartz. The spectrum thus obtained was filled from end to end with bright bands. When a piece of glass was interposed in the path of the incident rays, the length of the spectrum was reduced to a small fraction of what it had been, all the more refracted part being cut away. A strong discharge of a Leyden jar had been found to give a spectrum at least as long as the former, but not, like it, consisting of nothing but isolated bright bands.

"The lecturer then explained the grounds on which he concluded that the end of the solar spectrum on the more refrangible side had actually been reached, no obstacle existing to the exhibition of rays still more refrangible, if such were present. He stated also that during the winter, even when the sun shone clearly, it was not possible to see so far as before. As spring advanced he found the light continually improving, but still he was not able to see so far as he had seen at the end of August. It was plain that the earth's atmosphere was by no means transparent with respect to the most refrangible of the rays belonging to the solar spectrum.

"In conclusion, there was exhibited the effect of the invisible rays coming from a succession of sparks from the prime conductor of a large electrifying machine, in illuminating a slab of glass coloured by uranium."

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

The gutta percha bath may be supported in its vertical or slightly inclined position, in two ways. A piece of wood may be cemented by means of gutta percha solution or marine glue to the back of the bath, about one-third from the top. To this another piece of wood, sufficiently long to reach to the bottom of the bath, is connected with hinges—a piece of leather will serve the purpose, if brass hinges are not at hand. The amount of inclination at which the bath shall stand is easily regulated by the position of this support; but to prevent it slipping out too far, and endangering the contents of the bath, it is a good plan to connect it to the bath with a band which allows sufficient play and no more. This is easily done by piercing a hole near the bottom of the wooden support, and putting through it a ligature of gutta percha, with a knot or button at one end to prevent it slipping through the hole; the other end will easily be cemented, by heat, to the bath. This method has the additional advantage of affording a stay to the bath, and preventing it from bulging out, as some of our correspondents have complained their baths have done. To afford this stay, the piece cemented to the bath must, of course, be the full width, or it will be likely to cause bulging instead of preventing it.

Another method of supporting the bath, is by means of brackets of gutta percha attached to the back of it. Two pieces of gutta percha must be cut in shape, something like the following.

If the angle formed by the side and base of the bracket be a right angle, the bath will stand quite upright; in order to obtain the desired inclination from a vertical position, the side and base must form an acute angle. As a means of slightly altering the position in this respect, at will, a hinge may be formed in the brackets by cutting out a small strip in the direction of the dotted line, making a V shaped grove. By this means the brackets, which are cemented to the back, may be bent inwards towards the centre, and so increase the inclination of the bath at pleasure.

The inside of the finished bath may, as we have before said, be treated with the shellac varnish, if the operator desire. But a more effectual and satisfactory method of protecting the surface will be found in lining it with glass. This may be done without much difficulty, if care and accuracy be used in cutting the pieces for their respective positions. A description of the method of doing this would, perhaps, more properly come under a future head of working in glass; but to make the subject of gutta baths more complete, we will give it here.

Procure plate glass of tolerable thickness—it need not exceed one-eighth of an inch. First cut a strip exactly the size of the inside of the bottom of the bath, and slightly cement it in its place. Marine glue, shellac, or almost any similar cement, will do, as it is rather by mechanical pressure than by cement that each piece is intended to be held in its place. Strips accurately fitting each side are then to be cemented into their places in a similar manner. This done, pieces cut with equal accuracy for the front and back, are to be cemented each to its place. It will be seen now, that the pieces at front and back support the side pieces in position, independent of the cement, and if they have been cut with accuracy, and, still better, if the edges have been ground perfectly true, very excellent joints without cement are formed. Those who prefer it, can easily make certain of the joints by applying shellac varnish to each with a brush. The front and back are still, however, left without any support but the cement. Two more strips for the sides are to be cut narrower than the side pieces already cemented by just twice the thickness of the glass; these will fit in between the front and back, and support each in its position. These last side pieces are the only parts of the glass that depend chiefly on the cement for retaining their position, and must, therefore, be cemented with greater care than the rest. A very simple and inexpensive method of preventing all chance of injurious contact between the nitrate of silver solution and gutta percha is thus effected.

A very excellent method of protecting glass baths from breakage, either for the operating-room or travelling, has been suggested, by encasing them in gutta percha. This is easily

done by softening the sheet in hot water, and wrapping it round the bath, joining it as we have before described. The contraction in cooling will make it fit, as though it were part of the bath. The sheet for this purpose should be thin—one-eighth of an inch being quite thick enough. If the gutta percha were very thick and the glass thin, the contraction of the former might crack the glass instead of protecting it. The advantage of this wrapping is twofold: in the first place, it protects the glass materially from the chance of breakage; and, in the next place, it saves the contents without injury, even in case of the "smash" that will occasionally lend zest to the efforts of the photographic tourist.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 14*th August*, 1859.

An amateur photographer, M. Siard, has addressed to *Le Cosmos* a letter, which I give here in the writer's own words:—

"Whilst waiting the other day at Aulnoye, a small station on the North Railway, I observed a phenomenon which I never saw described. On the ceiling of the waiting-room, formed simply of painted boards, I observed a series of white lines traced in a very regular manner on the black dust that adhered to the ceiling, and particularly just above the lamp which lights the room, and which deposits a certain quantity of soot, rendering the white lines in question very visible.

"I went out to see what part of the roof of the waiting-room corresponded to these white lines, and found that the latter coincided with the edges of the wooden beams, which united, horizontally, the sheets of zinc composing the roof.

"Is it, then, by virtue of a galvanic action that the coal dust is condensed exactly where the zinc is in contact with the wood, and which is interrupted where the metal is not in contact with the ceiling? Or, is the phenomenon in question to be attributed to the mechanical action produced by the constant shaking of the little edifice by the passing trains?

"The cause once known, would it not be useful in the production of carbon positives? Such are the questions which I propose to study."

I have frequently observed the white stripes of which M. Siard speaks. I believe they are common enough in the waiting-rooms of most railway stations, for I have seen them in France, in Belgium, in England, &c., and I feel convinced that they are produced in the following manner:—The dust accumulates, or is condensed equally over the whole ceiling in the first place, but the shaking produced by one or two trains is sufficient to make this dust drop from the places on the ceiling which correspond to the wooden beams, the latter vibrating far more than the walls or the plaster, &c. which forms the rest of the ceiling.

But I can tell you of another phenomenon, somewhat similar, which I happened to observe some time ago in Paris. I had, at that period, a study in the *Quartier Latin*, where I used to sit and write very late at night. In this study was a porcelain stove, which burnt wood (principally *elm*), and the observation I am about to record was made during the winter. One night I worked later than usual; the fire in the stove was kept up the whole time, and I sat writing and smoking till after three o'clock, when I retired to bed. You may imagine my surprise on rising, about 10 or 11, to find everything in the study covered with a dark-brown coating of organic matter, having a faint odour of creosote, whilst the same odour was perceptible in the air of the apartment. This coating was certainly very slight, as to the *quantity of matter* deposited, but the colour was very intense and completely unalterable by chemical means. Where one book lay over another, the outline of the former was *indelibly printed* upon the latter; in the same way the images of bottles, pieces of money, stones, &c. which lay upon some writing paper, were indelibly stamped upon the latter. The paper was darkened everywhere except in those places where it was protected by some other body covering it. The image of this body was, therefore, produced in white upon a dark ground.

When the Duc de Luynes' prize was offered, I thought of the phenomenon I have just described, but I had no time nor inclination to endeavour to find out, by experiment, how these images were produced, and, at the present time, I am completely ignorant as to their cause, though, from the smell of creosote in the chamber, I am inclined to attribute them to the elm-wood burnt in the *calorifère*, and not to the smoke of the tobacco-pipe; moreover, I think they must have made their appearance with the first rays of the morning sun.

Two organic substances, which are comparatively little known, are peculiarly modified by the action of light. The first is *santonine*, a white, crystalline substance, extracted from a plant of our climate, *artemisia santonica;* this substance becomes of a brilliant yellow colour when exposed for some time to the solar rays. The other is the blue colouring matter of wines, *œnocyanine*. According to some observations published in M. Maumené's large work on wine, which appeared last year, this blue principle is modified rapidly when exposed to the sun in *white* bottles; it is very little altered, however, in *green* bottles, and preserves its composition and primitive aspect completely when inclosed in bottles of a *blue* colour.

I will now inform you of some curious observations that M. Bérard has lately made concerning the action of light on animals. It appears from his experiments, that differently coloured lights, or, in other terms, the different rays of the solar spectrum, have a very different influence on the development of young animals, on the hatching of eggs of insects, &c.

A great number of philosophers, from the time of Ingenhousz and Priestley down to the present day, have studied the influence of light on vegetables, but very few have hitherto paid attention to its action on animal organisation. Thus, whilst Priestley, Ingenhousz, Sennebier, De Candolle, Carradori, Knight, Payer, Macaire, and some others, made manifest the action of light upon vegetable respiration, absorption, exhalation—in a word, upon the phenomena of nutrition and development in plants—Edwards and Morren were almost the only observers who studied animal life from the same point of view.

Edwards has endeavoured to show that, without light, the eggs of frogs cannot be developed, and that the metamorphosis of tadpoles into frogs cannot take place in absolute darkness; so that, without the influence of light, a tadpole could never become a frog.

Again, Moleschott has shown that the respiration of frogs is most active in the day time, and diminishes considerably during the night. Morren, the formerly distinguished professor of botany in the University of Liège, observed some years ago that the *infusoria* of our stagnant waters evolve oxygen while basking in the sunbeams. The fact seems to have been since confirmed by Wöhler.

Dr. Hannon, professor of botany in the University of Brussels, thinks, however, that this oxygen evolved by infusoria during the day must be attributed to globules of *chlorophyle* (the green colouring matter of leaves and aquatic plants) swallowed by these animalculæ.

The experiments of M. Bérard are simple enough. Taking a certain quantity of eggs of the common blue-bottle fly (*musca carnaria, L.*), he divided them into separate groups and hatched them under differently coloured glass jars. In four or five days the *larvæ* produced were examined, and it was found that those born from the eggs which were placed under the *blue* and *violet* coloured jars, were far more robust, or more fully developed, than the others. The grubs born under the *green* jar were the least developed. After the larvæ of the blue and violet jars,

come next in strength and development those hatched under the influence of *red* light; then those under the *yellow* and *white* (or transparent) jars; and, finally, those of the *green*.

The series, beginning at the coloured light most favourable to the development of these eggs or larvæ, may be thus set down:—*Violet*, *blue*, *red*, *yellow*, *white*, and *green*.

The grubs developed in a given time in violet light were more than three times as large as those which were born and bred in green light.

No difference was observed in any physiological function when birds or mice were placed under the same coloured jars; their respiration, for instance, was found to be exactly the same in these circumstances as if they had been placed in ordinary day-light.

The author explains this by supposing that light cannot come into immediate contact with the bodies of these animals on account of their feathery and hairy coverings. Frogs, on the contrary, animals in whom cutaneous respiration is very perceptible, give different results:—

A given weight of frogs living entirely in *green* light evolve far more carbonic acid in a given time than the same weight of frogs under the influence of *red* light. If the frogs are deprived of their skin the result is precisely the reverse.

Last Monday, M. Leroux, tutor at the *Ecole Polytechnique*, deposited at the Paris Academy of Sciences a sealed packet containing an account of some new and curious effects of light. I shall wait with impatience the opening of this packet.

It appears from accounts sent to Paris from Rome by M. Secchi, director of the Roman Observatory, that the month of July of this year was remarkable at Rome, as at Paris, for the abnormal degree of heat that reigned during that period. At Paris we had frequently south-winds, and the excessive temperature was generally attributed to their influence; but at Rome it appears that north-winds have been most prevalent. M. Secchi endeavours, therefore, to explain the phenomenon otherwise, and asks whether it is not connected with a greater activity than usual on the surface of the sun? He observed that during the period of heat the number of solar spots was at its maximum; and it is not the first time that an excessive heat has coincided with this *maximum-period* of solar spots. Whether the spots of the sun affect the heat or climate of different localities on the earth's surface or not, it appears pretty certain that they have a very marked influence on terrestrial magnetism.

M. Hansteen, of Christiana, has lately published a note, in which he shows that two long series of observations, completely independent one of the other, in which the inclination and horizontal intensity of the magnetic needle were noted with different instruments, have given the same periods of maxima and minima at Christiana, at Brussels, at London, and at Paris. The minimum of inclination (or dip) corresponds with the maximum of horizontal intensity, and for both, the period, or the time which elapses between two maxima or two minima is exactly eleven days and one-ninth of a day. *This is the period assigned by M. Wolff to the maxima and minima of the solar spots.* Everything seems to indicate that the minima of solar spots corresponds with a greater intensity in the horizontal activity of the needle and a lesser inclination. The last minimum of solar spots and of the inclination of the needle took place about the middle of the year 1856.

THE ISLE OF WIGHT FROM A PHOTOGRAPHIC POINT OF VIEW.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—If your correspondent in the Isle of Thanet had visited the Isle of Wight, he would have been aware that there are views in this island which are as much superior to anything that can be seen in the locality with which he seems so much delighted, as they are more numerous. I have been now staying here for some weeks, and can therefore speak with some authority as to the advantages offered by the Isle of Wight to photographers, especially to those whose absence from London, or any other town, can only be for a limited period; and for the benefit of those, and the gratification of the desire which I, in common with many other amateurs, entertain to see myself in print, I beg to send you some account of what I have seen and done.

Before commencing, I may as well mention that I worked only with the dry process (Fothergill's), using sometimes a large plate, 13 by 12, and at other times a small stereoscopic camera, according to circumstances. The results I have obtained by using this process are very satisfactory; so much so, that I have no inclination to try another, not even the much-vaunted collodio-albumen. From the fact of my not having tried the latter process I preclude myself from giving an opinion of their comparative merits, but if the collodio-albumen process could give results equal to those I have obtained by Fothergill's, I think few who tried it would be likely to return to the wet collodion, with all its paraphernalia of tent and so forth.

The very small cost at which the Isle of Wight can be visited makes up to some extent for the high charges of the hotel keepers, who, in consequence of the large influx of visitors within the last few weeks, must have acquired rather an overweening estimate of the value of the accommodation they can give. On the day I arrived at Ryde I was assured that there was not a bed to be had in the whole town, and that only a few nights before strangers had been glad to take up their lodging in bathing machines, and even then a considerable number were wandering about the town all night. To avoid the risk of encountering this hardship in my own particular case I had my luggage placed on a coach going to Sandown, a beautiful place about six miles from Ryde, the road to it being through a most picturesque country, offering every variety of landscape scenery. On one side may be seen gently-rising hills and little valleys covered with waving corn, the purple-flowered clover or dark-green oats, spreading away for miles; while, on the other hand, hundreds of acres of perfectly flat, but by no means unprofitable, grazing land, interspersed with clumps of trees, and thickly dotted with cattle, which the richness of the pasture speedily brings to a condition which renders their continued existence unnecessary. Fortunately, the coach by which I rode belonged to the proprietor of the King's Head Hotel, at Sandown, and I was therefore driven to this house, which otherwise I should not, in all probability, have stayed at, from the fact of its not being very visible from the road, in consequence of its superior situation on the beach itself, which makes it likely to be overlooked by a casual visitor to the place, who is always apt to judge of the quality of an hotel by its outward appearance—a most deceitful criterion, as all experienced travellers know. Well, I was fortunate enough to obtain a room in this hotel which looked out upon one of the most beautiful bays in the kingdom. To the left, about three miles distant, the Culver Cliffs, the highest of which is over 400 feet high, rose from the sea with a boldness which astonishes the weak nerves of the writers of the guide books; while about the same distance to the right the view was terminated by the high hills—so high that I have seen the clouds strike against them and come rolling over their tops—which mark the situation of Shanklin Chine, of which I shall have more to say presently. Standing on the lawn in front of the hotel the eye was able to discern all the hollows of the cliff, and the cottages so snugly sheltered in the nooks, but which excite uncomfortable apprehensions in the minds of strangers as to the possible consequences to the inhabitants in the event of a portion of the cliff above them breaking away. Whenever M. Porro perfects his lens so as to enable me to take a picture of so great an extent at one operation I will return to the island, if it were only to bring away a view of this lovely bay.

The first negative I took after my arrival was one of

Shanklin Chine—the great curiosity of the island. It is simply a cleft in the land, with its widest part towards the sea, and narrowing upwards to the end, where the so-called waterfall trickles over the cliff. This waterfall is a delusion, and those who conceive an image of it in their minds from the picture given of it in those exaggerated publications to which I have already referred, will be disappointed, as the volume of water which falls under ordinary circumstances is about equal to what would fall from the cistern of a shower-bath if seven-tenths of its holes were stopped up. Of course, after a very heavy shower, the volume is increased for a short time, as was the case a few Sundays ago, when, after an exceedingly heavy storm, it rose above the lower rail of the fence which is placed at the head of the Chine to prevent people from tumbling over, and which I imagine to be quite two feet high, so that it became quite a respectable waterfall. While operating in this place I noticed a circumstance which is an additional proof to my mind that the presence of a certain degree of humidity in the atmosphere, combined with heat, renders the action of the chemical rays far more energetic than merely clear, bright sunshine. I exposed a plate at the lower part of the Chine shortly before noon, when the sun's rays must have fallen almost perpendicularly into it. (By the way, though, it is necessary I should first describe the appearance of the Chine, in order that your readers may comprehend better the conditions under which I operated.) The height of the cliff at the point I entered is about one hundred feet, and the width of the opening at the top is, perhaps, fifty feet more, the bottom being very narrow as one penetrates farther in. The sides are covered with underwood and trees, which grow vigorously, their branches meeting at the top so closely that their leaves almost shut out the light. Well, I exposed a plate at the time I stated, and considering the fact that the day was intensely hot, and that the solar rays must have penetrated to almost every part of the Chine, I thought an exposure of ten minutes would be ample—in fact, would rather overdo it; but, to my disappointment, I found that scarcely a trace of an image was visible on developing the plate. The next time I exposed a plate prepared at the same time as the preceding one, and, of course, of precisely identical qualities, but the period at which I exposed it was between three and four o'clock in the afternoon. I suppose it was natural that, having found an exposure of ten minutes at noon-day insufficient, I should prolong the exposure on this occasion; but having once formed an opinion I do not like to change it after a single trial; so I repeated the exposure for the same length of time. On developing I found the picture all but perfect; there was, it is true, a slight want of sharpness in the underwood, but not to an extent which injured the general appearance of the negative. I subsequently took another negative of a portion of the Chine, placing my camera immediately above the waterfall, the hour being the same, the length of exposure being increased one minute, and with an equally satisfactory result. The only explanation I can give of the superior activity of the chemical rays at this hour is, that the temperature of the humid atmosphere of the Chine had been raised by the prolonged action of the solar rays; otherwise, the amount of light present was greater in the first instance than in the subsequent ones. Other and similar causes have almost convinced me that much of the uncertainty which attends photographic operations is, in reality, to be ascribed to the varying conditions of the atmosphere rather than to faults in the collodion or other chemicals employed, as is most commonly done.

Quitting Shanklin Chine, but not before offering a small present to a dignified, not to say sullen, young lady, who acts as Cerberus, I went on to Luccombe Chine, which is about a mile farther on, and, though less imposing than the former place, is still very pretty, and well worthy the trouble of taking a negative. Moreover, there are two or three points on the coast which give very good pictures, very much resembling some of Mr. Gutch's interesting photographs of geological formations. From Luccombe to Black Gang Chine is about seven miles, and along here is what is termed the Undercliff, well known, doubtless, to your readers from engravings, which, however, fail to convey anything like an idea of what it is really like, to those who have never actually seen it. In some parts it is scarcely a quarter of a mile in width, in others it is about a mile, and has been formed by the separation of this portion of the cliff from the mainland. Whether the same process is going on now I cannot say, but similar slips have occurred at recent periods. The greatest slip of the kind I heard of was one which occurred at Niton some years back, when the ground, for a considerable distance, was in motion towards the sea, and, after progressing some distance, fell forward and broke to pieces, when the motion ceased, but the ground was left full of inequalities and large holes, capable, as an old woman told me, who was about fourteen years old when it happened, of swallowing up a hay-rick, if it had come that way. At present, these inequalities are by no means unpleasing to the eye, covered as they are with grass and wild flowers in profusion. From Luccombe, all the way to Black Gang, the photographer feels himself in the position of the girl of the eastern story, who was directed to choose a husband by walking through a corn-field and selecting the ear which pleased her best. He sees so many beautiful views that, conscious of his inability to take them all, he becomes fastidious, and goes on from one to another expecting every minute to see something better, and arrives, eventually, at the end without having taken half the number of negatives he would have liked. The plan I pursued was, to stop a day at one place and a day at another, and make excursions to the places of interest in the neighbourhood, rarely, however, taking more than three plates in one day, which I developed the same night. Perhaps the prettiest place of any along the Undercliff is Bonchurch. The village itself is not very large, though, I believe, it is gradually increasing in size, as, indeed, are most of the towns and villages in the Isle of Wight; but its situation is most delightful. Fine trees, covered with the most luxuriant foliage, abound; and behind it, and rising far above it, is Boniface Down, from which views of great beauty and extent may be obtained. There is one great advantage for the photographer in this island, which is, that the views suited for his purpose are so numerous that the chances of another photographer taking a negative from the same point of view as himself are very small; always excepting show places, such as Shanklin Chine, or certain of the churches, of which I shall speak presently; so that though I have seven negatives of scenes in and about Bonchurch, I am not in the least afraid of anybody else producing a print precisely similar; a most disagreeable circumstance when it occurs, as rendering one or other of the parties liable to be suspected of copying a print belonging to a *confrère*.—Yours obediently, IOTA.

Miscellaneous.

"L'UNIVERS" ON PHOTOGRAPHY.—It has not been, perhaps, so much the fashion to depreciate the photographic art in this country as on the Continent. We are, it is true, sometimes told that it is simply a mechanical art, and so forth, but that is not often now, and at present photography has taken her stand among the arts; but in Paris the same ridiculous attacks are persisted in. Thus we read in the *Univers*: "I recently read, and I believe *apropos* of M. Pascal's beautiful work, that, engraving had run its course, and that photography was about to take its place. The *apropos* could not possibly have been more inappropriate. I defy photography ever to produce anything equal to M. Pascal's engraving. Not only will photography never make a portrait, but it will never even copy a tableau or a monument. There is in things a life, they have a physiognomy which the artist alone knows how to seize and express. The artist does not copy; he feels, he interprets, he explains, he makes felt. How can the machine render that which it does not feel? If we cast a glance at the photographs

of the monuments of Rome, and there are admirable ones, and afterwards look at engravings of the same monuments by the Piranese, it will be seen that the artist has seized the beautiful and grand verity—the poetic verity, which the machine has failed to catch. Photograph the tableau of Titian which M. Pascal has just engraved, and you will have a heavy exactness, not a resemblance; there will be the same difference between this photograph and the engraving as between the first comer who will read fluently a fable of La Fontaine, and Delsarte who will interpret it. The first comer will mumble a platitude, Delsarte will make you receive the impression of its being an inimitable *chef-d'œuvre*. Both of them, nevertheless, pronounce the same words, and pause at the same stops. It will be the same with photography as with many other fine inventions which were to establish universal equality between man and man; it will not suppress genius, and the genius which it assumes to supplant will relegate it to the rank of utilities." The writer of the preceding is M. Louis Veuillot, the editor, and we believe proprietor, of the *Univers*—a paper which is only known here as having published the most savage and untruthful attacks on England during the time she was engaged in putting down the mutiny in India, and which attacks were from the pen of the same writer, who has now gone out of his way to make an onslaught on photography. The style is peculiarly M. Veuillot's; in attacking an art, or an individual, or a nation, he only strives to be bitter, and does not care two straws whether what he says is true or not. His motto is "hors de l'eglise point de salut," that is, of course, outside *his* church, the limits of which are very restricted. Lamartine was not within its walls; therefore, when it was proposed to raise a subscription for that distinguished man, he raised the cry of "Down with Lamartine!" and because England prefers freedom of religious opinion, he chose the moment when she was in trouble to rake up all the lying calumnies against English rule in India which have been printed within the last fifty years, and to exult in the anticipation of her imminent downfall among the nations; and now, because somebody has been rash enough to say that engraving has seen its best days, he comes forward to crush the miserable art which we practise. Of course we feel ourselves overwhelmed and utterly prostrated, now that so great an authority has pronounced photography to be merely a useful thing, and we hardly dare venture to indicate one or two points in his article which appear to us open to objection. He, first of all, defies photography to produce anything equal to M. Pascal's engraving. This engraving, we presume, from what follows, is one of a painting by Titian. Now, we have no hesitation in saying, that if a facsimile of a painting be desired, no engraver in existence could render it with the same fidelity as it could be obtained by means of photography. If the engraver produces a picture superior in an artistic point of view, it is because he has not faithfully followed the original, but has introduced improvements, the fruit of his own imagination and not existing in the original. When the engraver is also the designer, which is seldom the case, it is clear that he is an artist, and stands on the same level as the painter who creates the subject of his pictures; but to maintain that a copy made by hand is superior in truthfulness to a photograph which has been made by the picture itself, is simply absurd. Again, with respect to photographs of monuments, M. Veuillot asserts that they are inferior in appearance to good engravings of them. Granted that this is sometimes the case, yet this is not a proof that the latter are more truthful representations of the object, but the very contrary; for just so much as the hand of the engraver adds to the artistic effect of the engraving, by just so much does he depart from the truth which is accurately given only in the photograph. M. Veuillot asserts that photography is incapable of giving a portrait, but here he errs again. It is quite true that many who have their portraits taken—possibly including M. Veuillot himself—are dissatisfied with them, and very frequently because the likeness is only too faithful; but we admit that as a rule a photograph of an individual does not flatter him—although it not unfrequently does so—yet this is not the fault of the art, but of the sitter. Let the photographer try his utmost, and he rarely succeeds in preventing the sitter from making a face for the occasion. The art is not to blame for this. It cannot render what does not exist. Herein the artist has the advantage; he is not bound to give any particular expression, but simply that under which the sitter appears to most advantage, and this he heightens by a departure from the truth. Yet we have seen a vast number of photographic portraits so beautiful and life-like, that no painting, however elaborate, could equal them; the expression of the countenance rendered in so truthful a manner as to be almost startling. Hence, the want of resemblance which is often *felt* on looking at a photograph, and which the spectator finds it difficult to express in words, arises from the cause we have stated, viz., the fault of the sitter, because the photographer who can in one case produce a perfect portrait, would do so in all cases if it depended on him. That photography has, or ever can, entirely supersede the art of engraving, is out of the question; but that it will do so to a great extent, we have no kind of doubt. Hitherto, the chief attention of photographers has been directed to the improvement of the different processes employed, but improvement in this direction seems apparently to have reached its limits, and their attention in future will be directed more to the improvement of the apparatus. Already there are indications that it may, ere long, be possible to take a picture of a large size directly on a steel or copper-plate, which, by means of Mr. Fox Talbot's process, may be engraved without being touched by the hand.

Photographic Copyright.—The Irish Rolls Court has been again occupied with the copyright question. This second case also concerns the photographers. Messrs. Hamilton and Bewley, it would appear, have been taking copies by the process of photography of several prints published by Mr. E. Gambart, of London, namely, "The Departure, Second Class," "The Return, First Class," "The Schule Scaling," "The Horse Fair in Paris," (Rosa Bonheur,) and "It is I, be not Afraid." Mr. Brewster, Q.C., applied on Tuesday last for an injunction to restrain them. He was proceeding to state the facts of the case, when he was interrupted by Mr. Sullivan, Q.C., who said he did not intend to oppose the motion, as he was satisfied it was one in which an injunction would be granted. The Master of the Rolls said it was only necessary to have heard the notice of motion which Mr. Brewster had read, to feel satisfied that the injunction ought to be granted in this case. The only question which could be disputed by the respondents was this—whether the petitioners were the owners and proprietors of the several copyrights in the pictures stated in the petition. If this fact were so, and it appeared to be conceded by Mr. Sullivan, then it was plain that the respondents had no right to take photographs or other copies of these pictures for the purpose of selling them for their own benefit. Mr. Purcell said it was right on behalf of the respondents, Messrs. Bewley and Evans, to state that they were quite ignorant that these pictures were the property of the petitioner, or that they were acting illegally in taking copies of them. The very moment they became aware of the fact they at once desisted, and expressed their regret for what they had done. The Master of the Rolls said he had lately had occasion to look at the cases and authorities, which he had then before him, and no doubt could be entertained as to the illegality of the act. But the alleged ignorance of the respondents afforded no excuse. They knew they were appropriating for their own benefit the property of their neighbour. It was absurd to say that they thought they were justified in doing so. A man who picked a gentleman's pocket might as well say that he did not know the act was contrary to law, and that he desisted when he became convinced of the fact. No one had a right to appropriate to his own use the property of another, and literary or artistic property was just as valuable as any other species of property, and equally under the protection of the law.—*Athenæum*.

Photographic Notes and Queries.

TRANSFERRING GLASS POSITIVES TO BLACK PAPER.

Sir,—As you were pleased to approve of the transfer I sent you on a former occasion (p. 215), I subjoin the process by which it was effected:—

First, provide some *dark* coloured *glazed* paper of any tint you like; black, purple, or brown will do very well; some clear solution of gutta percha in benzal (about 30 grains to the ounce—in summer it may be a little thicker); some boiling water; cold water; a flat dish, a little larger

than the picture to be transferred, and a wooden roller (a common ruler will do) also a little larger than the picture.

Having provided these requisites, cut a square of the paper a trifle (say ¼ of an inch) larger than the glass positive, lay it coloured side upwards on to a piece of glass a trifle larger than itself, but so that one side and end slightly overhangs; hold the corner that is on the glass firmly with the finger and thumb. Pour on as much gutta percha solution as will cover it, assisting it to flow with the tip of your finger (avoiding, if possible, getting the solution under the paper); let it remain on the paper about half a minute, and then pour off the surplus into the bottle again; lift the paper from the glass by the top corner, and hold it before the fire till all signs of spirit disappear from the back, and till the coated side sets smooth and even; a bright fire is best to effect this.

Next, coat the glass positive with the gutta percha solution, as you would coat a plate with collodion; let it rest on the plate an instant, and then pour off and dry at the fire, similar to the paper.

Now pour (through a cloth) as much boiling water into the flat dish as will fill it about ½ an inch deep; gently drop in the glass plate, the *coated side upwards*, and over it float the paper, the *coated side downwards*, and with a brush or pellet of wool wet the back, when it will sink on to the glass; see that it covers the glass, and as soon as you see that the back of the paper is saturated with water, pass the roller over it, beginning at one corner: this must be done evenly to expel all water from between the two coated surfaces. Gently pour off the hot water from the dish, and if there be any appearance of a bubble on the paper, rub it out with your finger; but this will be unnecessary if you have rolled it carefully.

Leaving the plate and paper together in the dish, you must now pour over them a *gentle* stream of cold water till it is thoroughly cold (for a small picture little more than a quart is sufficient); then insert the point of a knife under the glass and lift it altogether from the dish; turn it face upwards, and, holding it by one corner, commence stripping *downwards* at the opposite corner. One of the top corners where the gutta percha is thinnest is the best to begin from. If due care is used it will leave the glass easily, bringing the picture with it embedded in the gutta percha. Gently blot off, and leave it to dry *spontaneously;* the heat of a room (say 70 or 80 degrees), or even warm sunshine will do, *but not the heat of a fire.* When *quite dry* it will probably have rather a mottled appearance, *then* hold it *near* a bright fire, and the picture will become clear almost instantaneously, and the transfer is completed. It must on no account be held to the fire till quite dry, or it will assume a shrivelled appearance.

Tedious as this process may read, it is all accomplished (except the drying) in 5 minutes or even less, and the result is, I think, superior to any transfers I have seen, as the details are so well preserved, the whole so thin and pliable as to be almost equal in that respect to plain paper, and "last though not least," I consider the material used insures the permanency of the picture.

The picture I now send is taken on purple paper, a small portion of which I inclose; the one I sent before was taken on black paper. J. WALTER.

MARKINGS IN THE FOTHERGILL PROCESS.

SIR,—In recent numbers of your valuable periodical I have seen some complaints of markings in the Fothergill process by "W. C. J." and "G. M.," &c. I have for some time past practised this process, and have sometimes (I might say many times) been annoyed in the same way. I have tried every plan of getting rid of them, both by making the baths acid, alkaline, or neutral, but to no purpose; neither do I think it is owing to the albumen being applied unevenly, nor to dust, nor to inequalities in draining; but I have found one thing during the course of my practice which I think will prove a complete cure for the markings complained of. No doubt your correspondents have been very particular in getting fresh eggs to prepare the albumen with: this I cannot doubt, as I myself have taken great pains to procure them as fresh as possible. I have shaken them up and left them to settle for twenty-four hours, and then prepared my plates and performed all the other operations in first-rate style, and, on exposing and developing, expected to get first-rate pictures; but, to my disappointment, they have all turned out as above mentioned, and marked in all sorts of shapes and sizes. And now, sir, for what I consider to be the cause of all these markings: I have put this albumen away for a week or more, and then prepared a plate just for experiment, as, during this hot weather, I was afraid that the albumen would have been spoiled. I have, however, found this plate turn out quite well and free from any kind of the markings so complained of. This is what I consider to be the real cause of the marks: the albumen has been used too fresh, as when I have prepared plates as soon as the albumen has settled, I have seldom had plates free from stains; but after having kept the albumen for a week or so, and then prepared plates with it, I have never found any of these markings make their appearance, but have taken some first-rate pictures with them. ONE IN THE NORTH.

COLOUR IN PHOTOGRAPHY.

SIR,—As every incident connected with photographic science is of interest to your readers, perhaps the following may be worth inserting. A few days since I purchased a tourist's stereoscopic camera and a dozen of Dr. Norris's plates, and determined to try what success I should have in taking views, having never before touched a camera of any kind. I simply followed the directions accompanying the plates, and the very first I took I discovered, on developing it, to be a counterpart of the scene, as to *colour* as well as definition. The preponderating colour is green (the object being a neighbour's house, surrounded with ornamental shrubs and trees), but the varied hues are very strikingly and accurately transferred. The picture is not a mass of green; the house shows white, and the paths and walls are easily distinguished. Can you tell me how I accomplished this, as I am in the most profound ignorance whether such accidents are common, and what steps I had better take to repeat my former effort with similar success? EDWD. GARROD.

Chronicle Office, Norwich.

[We think our correspondent has mistaken the usual colour of a good negative for an approach to that great desideratum—the fixation of colour. It is a very common circumstance—so common, in fact, as not to excite the wonder which it deserves—for a good negative to show, when viewed as a positive, decided traces of the natural colours of some, if not all, of the various objects which it depicts. The presence of some peculiar kind of organic matter seems to influence this result, and we are sure that if some of that surplus experimentive energy which is now wasted on discovering "New Dry Processes," were to be diverted into this channel, it would be rewarded with very important results.—ED.]

TRANSPARENT POSITIVES TAKEN DIRECT IN THE CAMERA.

SIR,—Having lately made some attempts at Fothergill's process, I am much surprised to find, on developing my plates, that some of them produce negatives and others *transparent positives.* Can any of your readers solve this problem? I enclose two of the plates—the one marked No. 2 I developed this morning. On the first appearance of the picture, it came out as a negative; but my solution becoming thick, I poured it off and rinsed the plate; on a re-application of the developer, the remaining portion of the picture came out in the way you see—a transparent positive. I have had but little experience in photography, and have scarcely attempted any other process than Fothergill's;

but, as far as my experience has carried me, it seems quite a lottery whether my pictures turn out one or the other—plates prepared at the same time, developed with the same solution, and, sometimes, as in the present instance, the same plate, partaking of both characters. W. H. B.

[The pictures sent by our correspondent are most remarkable, and the phenomenon is one which well deserves careful investigation. Viewed as transparencies, these plates are almost as perfect in their positive effect as some of the most admired French glass stereograms. Their sharpness is surprising; and the intensity of the dark parts and the clearness of the whites show, that if we once knew the causes of this singular reversal of the usual effect of light, we should be placed in possession of a new and valuable branch of our art, and one which would prove of the greatest use in many of the photographic requirements of the present day.—Ed.]

TONING WITH PLATINUM.

Sir,—"Gwenthlian," I think, has used the platinum bath in *too acid* a condition; perhaps the acid was chemically pure instead of being of the ordinary commercial strength. I did not find that much over-printing was necessary. The brown tones which I obtained nearly approached black, but I did not desire to carry the toning farther, as I was well satisfied with the beauty of the brown tones which the proofs acquired. For certain views, such as landscape scenery, I think the rich sepia tones which platinum gives will be found quite unequalled by any shades of *brown* obtained by any other process. I would not recommend the process for obtaining black tones, as the trouble would be too great, and we have so many easier methods of getting black tones. I think your readers will find, if they turn their attention to toning with platinum, that where rich, dark brown tones are desired, they will succeed more readily with platinum than with gold.

Alexander Watt.

PHOTOGRAPHY AND GARDENING.

Sir,—In reply to Mr. F. W. Evans's query in the "News" of the 12th inst., permit me to state that about three months ago I used some water from the developing sink to water a few plants in a room window, and had the mortification to find that next morning they were all shrivelled up and apparently dead, the leaves being all spotted light brown. This, I presume, was caused by the nitric acid in the developer. I at once gave them a copious supply of pure water, which ultimately restored them to health. But for this, I have no doubt they would soon have all been dead. Excelsior.

PHOTOGRAPHY AND GARDENING.

Sir,—In reply to your correspondent, "F. W. Evans," I can inform him that I have used the washings from the developing sink for watering plants without injuring them in the least. Success.

ANSWERS TO MINOR QUERIES.

Spontaneous Decomposition of Collodion Negatives.—*York* sends us an account of a curious decomposition which some collodion negatives of his taking have undergone. They were taken in the ordinary way—developed with pyrogallic acid, fixed with hypo., and then, after well washing, allowed to dry. They were not varnished, but were put away in an ordinary deal plate box. The appearance they now present (after remaining shut up in the box for upwards of a year) is, a loss of intensity in the dark parts of the picture, which have become pale and brown, quite different from that which is sometimes caused from hyposulphite of silver not having been perfectly washed away, and therefore destroying the picture by crystallisation. We think that the cause of destruction in this case must be the decomposition of the pyroxyline. Such an occurrence has been noticed on more than one occasion; and if the pyroxyline had been of an inferior quality, it is not unlikely that it has liberated corrosive oxides of nitrogen, with consequent destruction of the image; the decomposition in this case being similar to that which sometimes takes place in gun cotton which has been kept for some time, sufficient peroxide of nitrogen being sometimes evolved to destroy the paper in which it is kept. Varnishing the negatives appears likely to protect them—at least, we have never heard of a negative fading which had been varnished with good spirit varnish.

Substitute for Ground Glass.—*J. C. Gray.* A good substitute for the ground glass in the camera can be made in a few minutes by rolling a piece of glazier's putty over a clean piece of plate glass. A few trials will show the degree of stiffness the putty should be of, in order to produce the finest effect.

TO CORRESPONDENTS.

H. S. T.—We will think over the suggestion of the lists; it seems a very excellent one, but, to be of use, it should include all the processes. In answer to your queries—1. We cannot understand how it was that a mixture of alcohol and ether failed to remove the crust from an old collodion bottle. Perhaps there was too much alcohol, or the bottle might have been wet. Try some mechanical method of removing it, such as shaking up sand and water in it, or scraping the crust off with a stick, and afterwards soak in strong solution of soda. A toning bath bottle may be cleaned by pouring into it a little strong nitric acid. 2. An albumen bottle is best cleaned by means of cyanide of potassium solution, allowed to soak in for some time. A varnish bottle will offer more difficulty; different solvents should be tried one after the other, such as alcohol, benzol, old waste collodion, &c., and when the varnish is softened, rinse out with abundance of water, and allow a warm, strong, solution of soda to stay in it for some time. Most probably the list will appear in our next.

J. S. O.—We cannot, of course, answer for the genuineness of all the "thirteen postage stamp" secrets which are being daily advertised, and if a person makes up his mind to answer one, he must consider it in the light of a lottery, he *may* get something useful; but, on the other hand, there is a great chance of his losing his money altogether. Your name shall remain as hitherto.

J. W. P.—We think the solar camera likely to be of great use in printing large positives from small negatives, provided the demand is sufficient to render it worth while to go to the expense of an instrument. As to the validity of the patent, we cannot give an opinion. We cannot see what there is in it to patent, as the construction has been described and carried out frequently in this country.

J. G. Johnstone.—1. You will find many useful articles on the subject of your queries in numbers previous to No. 36. The circular stains you mention are incipient blisters, and can only be avoided by taking the precautions customary in such cases. 2. Common water may be used for the bulk of the washing, provided distilled water is employed for the last rinsing or two.

Calos.—1. Do *not* add alum to the fixing solution for positive prints, unless you wish to spoil it. 2. No, undoubtedly. 3. Whenever the information given in these notices is of general interest, we give it in such a manner that both question and answer may be known to the general reader. In other cases it would only be a waste of space to give the query as well as answer.

Devon.—The complete portrait combination should be used for the lenses in your magic lantern, and the picture to be magnified should occupy exactly the same position, with respect to the lenses, as it did whilst it was being taken in the camera. The condenser should be between the lamp and the picture, *not* between the picture and lens.

A Novice.—We cannot possibly account for the extraordinary occurrence mentioned by our correspondent from the mere statement of the fact. Such a thing is quite opposed to all our experience, and we should, therefore, require a full account of the preparation of the materials, and mode of manipulation, before we could venture a guess.

F. C. L.—Many methods have been given in recent numbers of the "Photographic News." We cannot refer you to better processes than will be there found.

J. Beldon.—Received. We see no reason why the Aberdeen Society should object to receive the case of specimens as you describe, but if you have any doubts you should write to the secretary.

N.—We have found a coating of soft solder applied over the lead of use in arresting or preventing the corrosion of the surface. We will consider the query about gutta percha and reply in a subsequent number.

J. W. B.—Either blue glass, of the colour inclosed, or colourless glass with muslin curtains, sufficiently high to prevent passers-by looking in. Clear colourless glass for the roof in either case.

J. C. S.—Increase the strength of your silver bath, as it is likely that it has become weakened by use. If this does not remedy the spots, use "Θ's" toning process given at the commencement of our second volume.

J. O. P.—We cannot undertake to do chemical analyses for every correspondent who forwards substances to us with the request that we will tell him what it is.

M. D.—The sample of waxed paper is unfit for use. From its granular appearance we should be inclined to say that the iron with which it was ironed had been far too hot.

S. B. C.—See answer to J. W. P. The enlarged positives are well adapted for colouring afterwards.

Focus.—Place the diaphragm immediately in front of the anterior combination.

A Young Photographer.—Send a stamped and addressed envelope and we will reply.

E. G. W.—We will obtain the desired information and insert it in the "News."

W. Woodward.—In an early number.

Communications declined with thanks.—P. O. S. T.—A Young Photo.—Alloy.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Sir O. P.—Theophilus.—St. El.—M. A. R.

In Type.—H. M.—X. X.—An Amateur.—G. R. G.—J. B. Hockin.—B. M. Brackenridge.—M. A. Root.—J. S. Overton.—G. R.—Knoxian.—W. L.—G. H. W.—I. W. W.—P. Debenham.—R. J. Fowler.—Success.

⁎ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 51.—*August* 26, 1859.

OBSERVATIONS ON M. NIEPCE'S NEW ACTION OF LIGHT.

BY M. L'ABBE LABORDE.

IN repeating the experiment made by M. Nièpce on the persistent activity of light, I remarked, at the very commencement, a characteristic difference between the effect produced by the insolated paper, and that which results from the direct action of the light. When a sensitised paper is exposed, for a few instants only, to the direct action of light, the tint it acquires is only superficial, and may be removed by scraping it lightly with a penknife; but if this paper has undergone a sufficiently prolonged action of the insolated paper, this tint is not merely on the surface, but penetrates through the whole substance of the paper.

In each of my experiments, I used a tinned iron canister, 18 centimetres in height and 8 in diameter, which I lined with a thin piece of cardboard impregnated with tartaric acid, and which had been exposed to the sun for about four hours.

The sensitised paper, prepared as for ordinary positives, was applied on a glass disk fixed on the lower part of the cork which closed the bottle. The action of the insolated paper was prolonged for from twelve to fifteen hours. A glass plate, notwithstanding its transparence, protected the sensitised paper perfectly, provided it had been carefully cleaned, otherwise the paper blackened as much, or even more, than if the glass had not been present.

First Experiment.—The sensitive paper was partly covered with a thin bit of glass, and across this a second piece was placed, which was intended to prevent any action from *radiation*, but not from circulation. When I opened the box, the sensitised paper was blackened everywhere, except immediately under the glass in contact with it. Still, if this glass be exceedingly thin, so that the cross piece is brought very close to the paper without being actually in contact with it, it preserves the subjacent paper from much of the action of the *circulation*. I substituted a piece of ivory for this second piece, with a like result. My motive for doing this was, because people might have said that the insolated paper was capable of acting through transparent substances, provided it was aided by air frequently renewed: since certain impressionable substances—as bitumen of Judea, for example—are insensible to the action of light when excluded from contact with the air.

Second Experiment.—The box containing the insolated cardboard was left for four hours in a hot place; I then opened it carefully, with the mouth downwards, and drew out the cardboard very gently; I quickly placed a piece of sensitised paper on the bottom of the cork, and laid a strip of glass across it, and then fitted it into the box; I then put it in a cool place, and when I opened it, after the lapse of twelve hours, I found the uncovered portion of the sensitive paper blackened, notwithstanding the absence of the insolated cardboard.

It is quite unnecessary to discuss these two experiments to demonstrate what is so very evident, that we have to do with an emanation, and not a radiation.

What is the nature of this substance which escapes from the insolated cardboard, and acts on the sensitised paper? The following facts prove that it is a volatile acid—very probably formic acid:—

a. Blue litmus paper, partly covered by a strip of glass, and exposed to the action of the insolated cardboard, always reddens on its uncovered surface. This experiment I repeated many times.

b. In order to prove that this volatile acid was really the active substance, I enveloped a large glass tube in blotting paper, moistened with a solution of potash; I fixed it to the bottom of the box on the inside, so that it rose to a level with the opening; I then introduced the insolated cardboard, and placed on the bottom of the cork a piece of sensitive paper and a piece of blue litmus paper, and across that a strip of glass, and then closed the box. At the end of twelve hours, neither the blue litmus paper nor the sensitive paper had changed their colour; in the absence of the volatile acid, which had been neutralised by the potash, no action was manifested.

To determine positively the nature of this acid, it would be necessary to collect a ponderable quantity. I had recourse to other means, the *ensemble* of which renders the existence of formic acid very probable.

1. I put a little distilled water in a very clean porcelain capsule, and exposed it for twelve hours to the action of the insolated paper. A few drops of nitrate of silver were then added to it, and it was heated to ebullition; the liquid speedily became darkened, as happens when the same experiment is made with the most minute quantity of formic acid added.

2. I replaced the distilled water by a solution of acetate of lead, and after leaving it to the action of the insolated cardboard for two days, I found the surface covered with a lot of little white points, which I was able to take up with paper; I boiled these particles in a weak solution of nitrate of silver, which it reduced to a metallic state, as would have happened if formiate of lead had been employed directly. It may be urged that minute quantities of tartaric acid had fallen from the cardboard into the liquid, and so formed tartrate of lead; but tartrate of lead does not reduce salts of silver, as formiate does.

3. By smelling the interior of the box at the moment when it was opened, a mingled odour of burnt sugar and formic acid could be detected. The presence of formic acid is likewise very naturally explained, when we consider the influences to which the paper impregnated with tartaric acid is submitted.

In fact, the action of light may manifest itself by two entirely contrary effects—reduction or oxidation. The direct effect is always a reduction; it manifests itself thus on the salts of silver, gold, &c., and to this must be added that which exceeds all others in its energy and its consequences—the reduction of carbonic acid in the leaves of plants. But reduction supposes the separation of the oxygen, or any other electro-negative element—a separation which brings it to the nascent condition, and renders it eminently apt to unite itself with substances with which it is in contact. If the oxidised body, by its nature and properties, becomes more apparent and palpable in some sort than the reduced body, the oxidation appears then to be the sole effect of the light; but it is a secondary effect, such as is observed in the case of bitumen of Judea, essence of turpentine, linseed oil, &c.; I would add, and on tartaric acid, if it be admitted that, under the influence of light, oxygen tends to separate itself from the organic matter impregnated with tartaric acid; for this oxygen in the nascent state would unite itself with the tartaric acid and produce formic acid. The affinity

of oxygen for tartaric acid likewise assists in this transformation; it suffices, in fact, to add peroxide of lead to a strong solution of tartaric acid to obtain immediately an emanation of formic acid. I availed myself of this property, which tartaric acid possesses, of oxidising itself easily, to check the preceding effects in the following manner: I put a concentrated solution of tartaric acid and peroxide of lead into a test tube; on the mouth of this tube, and, consequently, above the liquid, I fastened a large cork, having on its under side a piece of sensitive paper, and a piece of blue litmus paper, crossed by a strip of glass, and put it in a dark place, and, after a short time, I found that the sensitive paper had darkened, and the blue litmus paper reddened, precisely as if they had been exposed for twelve or fifteen hours to the action of the insolated cardboard. I will add, as a further point of resemblance, that in both cases the reddened litmus paper, on being left to the action of the atmosphere, re-assumed its original blue tint.

The facts I have stated will no longer permit the admission of a persistent activity of light, and still less of a stored-up light; but if the experiment of M. Nièpce, thus explained, loses its strangeness, it does not the less preserve the seal of originality which characterises all the researches of its author.

MM. Bouillon and Sauvage had already concluded from their researches that the reduction of a sensitive paper was neither due to the action of heat nor stored-up light. The only experiment which they cited to prove that this reduction was not due to stored-up light might leave some doubts in the mind, since M. Nièpce had himself made it, and refuted the conclusions that might be drawn from it, by stating that the luminous radiations emitted by phosphorus burning slowly in the air did not act through glass.

MM. Bouillon and Sauvage attribute the reduction of the sensitive paper to a peculiar volatile body, and suspect ozone; but ozone, far from being a reducing agent, is an eminently oxidising body. We might assign it another *rôle*, indirect but decisive, entirely similar to that I have attributed to oxygen, which light may separate in a nascent statement from organic matter; for ozone is nothing else than oxygen restored to, or preserved in, a nascent state, susceptible from that very circumstance of oxidising most bodies; and as almost all organic substances—gum, sugar, lignine, tartaric acid, &c.—produce formic acid with a mixture capable of oxidising them, it will be seen what *rôle* ozone, or oxygen in a nascent state, may perform, not only in this first experiment of M. Nièpce, but likewise whenever organic matters are exposed to the action of light.

[Our own experiments, as well as those subsequent conducted by M. Nièpce, prove that MM. Bouillon and Sauvage are in error in asserting that heat does not reduce the silver in prepared paper.—Ed.]

FIXING PHOTOGRAPHIC PRINTS.

BY MR. SNELLING.

The various theories on this subject advanced by numerous writers on, and practisers in, photography, do not seem much to have helped the matter. The principles laid down are generally sound; but photographers are sometimes misled by those who delve more into theory than practice. We all know that, in order to fix a proof, it must be submitted to a chemical solution, which shall have the power to deprive the paper of every particle of silver that remains unchanged after its submission to light under the negative; and also that it is equally necessary to remove afterwards every trace of the chemical agent employed in the solution of this unchanged silver from the picture.

For this removal of the unchanged silver, various methods have been adopted; but it is now conceded by all photographers, that hyposulphite of soda is the best and safest solvent. The length of time to which the print should be submitted to the bath of hyposulphite, is also a mooted point. Many photographers advise, that the print be submitted to one or more baths of pure water before putting it into the fixing bath; others place it first into a fixing bath and afterwards into the toning bath, and lastly into plain water. I think a simpler way better.

First soaking in pure water, it is said, gives the print a clearer and more brilliant effect. This I doubt. The washing out of the unchanged silver in plain water is not sufficiently expeditious to prevent a slight darkening in the lights, even in a dark room—the water itself, in my opinion, derived from long practice, inducing a change in this respect.

Submitting the proof first to a hypo. and then to a toning bath is also objectionable, particularly when it is desired to produce fine blacks. By this method the print imbibes an excess of hyposulphite of soda, that no amount of subsequent washing will eradicate, without destroying also its delicacy and strength of colour. Mr. Evrard says in his Treatise on Photography, that "water has no action on the salt of silver which the light has reduced," &c. To a certain extent this is correct, *i.e.*, so far as the salt itself is concerned; but long soaking in water—sufficiently long to deprive the paper of all the hypo. imbibed by this process—loosens the texture of the paper to such a degree, that portions of the changed silver are detached and washed away, leaving the proof exceedingly weak. In following this method, it is usual to leave the print in the hypo. solution until it becomes of a reddish-brown colour; it is then submitted to the toning bath until the desired colour is obtained. Such pictures, so treated, will most assuredly fade. In fact, the destructive principle commences in the toning bath, and no amount of washing will prevent its progress towards the entire obliteration of the picture. Both baths also soon become acid from hypo-sulphurous acid—a most powerfully destructive agent. This is hastened in hot weather, and but a few seconds' immersion will so effectually impregnate the print with this acid, that nothing can save it. I am speaking now of the use of two baths: the first a fixing bath of hypo. only; the second, a toning bath composed of hyposulphite of soda, chloride of silver, and chloride of gold. The first bath is useless. When the second only is used, it should be of a strength sufficient to produce the deepest purple tint—in from ten to twenty minutes—not more than twenty. To assure permanence by this bath, the deep purple tint should never be passed. To stop a little short of this would be more advisable. Sulphuration commences the moment the picture passes to the bath. Allow the picture to remain a minute longer in the bath, after it has passed the purple, and a slight fringe of yellow will circle its edges; take it out, wash it twenty-four hours in running water, and submit it to the light under any circumstances you please, it will fade in a short time.

In toning, there are no general rules that will apply to any one bath. The same bath will work differently on different days, and frequently at different hours of the same day. I have found that my baths very frequently give beautiful, clear blacks in the morning, when in the afternoon no amount of toning would produce the same effect. Every attempt to change its operations only made bad matters worse. I therefore came to the conclusion to let them alone, and be guided entirely by the brilliancy or dullness of the print during its immersion: so long as they were clear and brilliant both in lights and shades I made no alterations. When dullness, or a veil appeared in the whites, I added hypo. in small quantities until the defect was corrected. If the shadows presented the same appearance, I gradually added chloride of gold, which often proved effectual; and when both lights and shades were dull or clouded, both hypo. and chloride were added; but when these were not effectual, I found the bath to be too acid, and neutralised it with carbonate of soda.

The amount of gold or silver taken up by each print cannot be safely calculated for universal practice, as no two samples of paper will work alike in this respect; as a rule, therefore, add more silver than gold when the picture

appears weak or thin, after obtaining the desired colour in the proper time—which should be in not more than twenty minutes. Of course it is necessary that the print should be brought up to the proper strength in the pressure-frame; which strength can only be ascertained by due reference to the capabilities of the negative, some requiring more intensity of colouring in the positive than others, to produce a given result. Much of the brilliancy of a print depends upon the quality of the paper. A porous—badly-sized—coarse-grained paper will be deficient in this respect; and it is the fineness of grain, more than any other quality in the albumenised paper, that renders the prints made on it so charming to the artistic eye. It is, also, only on albumenised paper that a permanent sepia tint—so much admired by artists—can be obtained. In order to obtain this much-desired colour with a surety of permanence, we must employ a salt that will give it within the period of time necessary to fix a print. Two drops of chloro-chromic acid in the ordinary gold bath of half a gallon, will produce a very fine warm sepia, or brown colour; but there is some fear of its eventually destroying the picture.

The use of warm water in fixing I consider decidedly injurious. The only good quality it possesses, is the speedy removal of the hypo. Its objections are, weakening of the print, destruction of the sizing, and consequent loosening of the fibre; and imparting greater tendency to the sulphurisation. Cold water is decidedly preferable, as it obviates all these difficulties without creating new ones, besides giving greater brilliancy. Prints treated in every way alike, except in the temperature of the washing bath, produced the differences above stated; and when exposed to the atmosphere, those submitted to the warm solution faded in a few days, while the others have remained unchanged. Where running water can be procured, no other should be used for the final washing.

It will be observed that prints, when immersed in the toning bath, pass through several tints of colour—no matter what the composition of the solution may be. First we have a light yellow ochre, passing through several shades to a deep brown, from which it changes to purple, which may be deepened to an intense black, if the printing and toning solution are sufficiently strong. If the print is continued in the solution after it has attained the black, the process of change in colour is reversed, and it again goes through the same series of colours, from black to yellow, and it may be suffered to remain until not a trace of the picture is left.

Now this fully proves that there is a certain point to be attained in the toning of a print where perfect fixation is obtained; to go beyond, or fall short of this point, entails destruction of the picture. This point is a delicate one in most instances, and it requires a good perception of colour in the manipulator to decide upon it in all cases. This point is the purple stage. Some solutions work up to this stage very slowly and give it with great intensity, while others give it quickly, and of various tints and strengths. Occasionally it is perceptible for a very brief period, in which case it is necessary to be expeditious in removing the prints from the bath, or they will enter the destructive stage before their removal can be accomplished. This purple stage is even perceptible in pictures toned to the brown (or umber) colour, seeming simply to cover the surface of the print as a perfectly transparent film. It remains but an instant, the print quickly passing to a decided brown, and from that to the lighter shades as before described. In fact, the change is so rapid in some new baths, that it is dangerous to take the eye off the print in its passage from the first brown to the purple tint.

As I before remarked, the rapidity or slowness of toning depends greatly upon the temperature, being accelerated by heat and retarded by cold, and it should be the object of the photographer to keep the solution at as even a temperature —say 60°—as possible.

The theory that the strength of the salting solution should be in proportion to that of the nitrate of silver, is not always correct. Were it possible always to obtain paper perfectly uniform in weight, texture and size, it might hold good; but as this cannot be, the best rule is, that the strength of the salting should be in proportion to the thickness and closeness of the paper.

From this it follows that the manipulator must be constantly on the alert to modify his printing formulas to suit the *nature of the paper* to be worked. The sizing of the paper also modifies the colour of the print.

Another point to be observed in order to obtain certain results, is that the colour and tone of the positive is in a measure dependent upon the negative. This may seem strange to some, but it is nevertheless true. It is not possible to obtain black prints from some negatives, while others admit of any colour or shade of colour.

From what I have said on this subject I arrive at these facts, to establish the certainty of permanence in photographic positive proofs:—

Weak baths will not produce strong colours without endangering the print.

The quicker the print can be toned to the required tint and the unchanged silver washed out, the more certain the fixation; and, therefore, a bath sufficiently strong to do this in from five to twenty minutes (the latter being the utmost extent) should be used.

The point of certainty for the complete fixation of the print is the purple stage, therefore prints should not be permitted to pass or fall short of it.

Warm solutions should never be used, owing to the rapidity with which they dissolve out the sizing and weaken the picture. They also destroy its brilliancy.

ON OBTAINING DIRECT POSITIVES ON GLASS.

BY M. LE GRICE.

It very frequently happens, that, in taking photographs upon collodion, pictures are obtained which, when examined by reflected light, are very visible, and more or less beautiful. These photographs are known to all, under the name of direct positives on glass. They are sometimes of a deep yellow colour, and sometimes exhibit much analogy with a daguerreotype proof, without, however, possessing its delicacy. These pictures are very much admired by beginners in the art of photography, but are very little esteemed by artists, because their execution in general leaves much to be desired. I have for several years busied myself with this process, and after many experiments, have succeeded in producing these positives with certainty and ease; and the proofs which I have sent you offer, in my opinion, certain advantages—as, for instance, the greatest lights are well marked, without, however, presenting a metallic and lustrous surface. Some modelling may be seen on the pure whites, and there is still a marked contrast between the lights and shadows. The different muscles of the face are well defined —an advantage but rarely found in portraits upon paper, which generally are indebted for their beauty and finish to the skilful hand of a painter. All collodions, if simply iodised, as by iodide of potassium, of ammonium, of cadmum, calcium, &c., without the addition of other salts, as the bromides and fluorides, &c., and the silver bath not being impregnated by iodide of silver, yield, as is generally known, a black and white picture without half tints, and without any modelling; so that one is always obliged to have recourse to these latter substances in order to obtain a perfect impression. The combination that I use, and which has been used with great success in Germany, where it was published some time since, is the following:—A mixture is made in a bottle, with the necessary precautions, of five grammes of bromine in thirty-five grammes of absolute alcohol. This mixture is poured into another bottle containing five grammes of hydrate of lime; this is shaken, and to it is added from twenty to twenty-five drops of hydrochloric acid. In a few days, the liquid which covers the lime entirely loses its colour, and becomes as limpid as water. Ten, fifteen, or

twenty drops of this mixture, added to 100 grammes of a collodion iodised with iodide of zinc, produce the collodion which I use, and which I have found the most sensitive of any tried by me, for the red and yellow rays. The picture is developed by means of a solution of sulphate of iron, with the addition of boracic or acetic acid, with from two to three per cent. of alcohol, and is fixed with hyposulphite of soda or the cyanide of potassium. In order to obtain negatives, the exposure must be longer; and after the picture is fixed and washed, it is moistened with a weak aqueous solution of nitrate of silver, containing only the slightest quantity of iodide of silver in solution. The moistened plate is exposed for a very short time to a faint diffused light; and, without washing, it is plunged into a bath of solution of sulphate of iron, and then washed, &c. By this process negatives are obtained, in which the half-tints are better than in those obtained with a negative collodion, and developed by pyrogallic acid. Too long an exposure to the diffused light is sometimes the cause of the picture being converted into a positive, as seen by transparency. This is also the case when the solution of nitrate of silver with which the glass is moistened, contains too much iodide of silver.

THE ROCK-TABLETS OF MOUNT SINAI.

We believe it was the elder Niebuhr, who, in his travels in Arabia, first mentioned those huge rock-inscriptions of Sinai, which seem to extend to the length of several miles. Johannes von Müller alludes to them most pointedly, and recommends them to the attention of travellers and archæologists. We are not aware whether Sir G. Wilkinson ever mentioned them in his works, being subjects of an *ambiguous* bearing. However, nothing satisfactory could have been made of them until now, when albumenised plates, 36 inches long, can bring them down to the meanest understanding, as the phrase goes. It was, of course, quite impossible to erect any scaffolding on the flanks of Mount Sinai, and to copy those rock-tablets, at any rate incompletely and unsatisfactorily. But now the remedy is easy. At whatever height those inscriptions may exist, and whatever extent they may embrace, they will and must descend, *in propria personâ*, as it were, and reappear on the sheets of the camera with all their characteristics. In such cases lies the triumphs of photography, to render services to science and art which, hitherto, no amount of labour, or the most wasteful expense, could have achieved. We trust the time will not be distant, when some of our enthusiastic travelling photographers will spend their vacations in copying those rock-tablets of the Sinai of Moses. Judging from the inscriptions of Nineveh, they may illustrate the historical part of our sacred books.

Dictionary of Photography.

Fluorine.—An elementary body unknown in the uncombined state. It is analogous to chlorine, bromine, and iodine, and, like these bodies, forms compounds with the metals which are similar to the chlorides, bromides, and iodides. These are called fluorides; and as they are of some value in photography, we will give a description of some of the most important of these salts:—

Fluoride of Ammonium.—This salt is obtained by saturating hydrofluoric acid with ammonia; or, by heating a mixture of sal-ammoniac and fluoride of sodium in a platinum vessel, the lid of which is kept cool by dropping water on it; the fluoride of ammonium, in this case, sublimes on the under surface in small prisms. The salt is permanent in the air, has a pungent, saline taste, and slightly etches glass, both in the solid form or in solution. It dissolves readily in water, and is sometimes used in photography, as are also the other fluorides, to obtain increased rapidity.

Fluoride of Calcium, or fluor spar, is a very beautiful mineral, occurring in large cubical crystals of a rich blue or green translucent appearance. It is the principal source of the compounds of fluorine in commerce, and is largely used in the preparation of hydrofluoric acid.

Fluoride of Potassium is a white, soluble salt, which may be prepared by adding hydrofluoric acid to carbonate of potassa, and evaporating the solution to crystallisation in a lead capsule. It is used for similar purposes to the corresponding ammonium salt.

Fluoride of Silver.—A compound of equal equivalents of the elements fluorine and silver. This salt differs from the other compounds of silver with elements of the chlorine group, inasmuch as it is very *soluble in water*. For this reason it will be seen, that formulæ in which fluoride of potassium or ammonium are introduced, in conjunction with an iodide or chloride, are based upon an ignorance of the properties of this salt; as, in the sensitising process, the fluoride of silver would dissolve out, and remain in the silver solution. If it be desired to introduce fluoride of silver in the sensitive film, it will be advisable not to introduce it along with the iodising compound, but to mix it with the *last* bath in which the film is introduced before exposure. Thus, in the collodion process, fluoride of silver should be introduced into the nitrate bath if experiments are to be made upon this body; in the wax paper process a little fluoride of silver should be dissolved in one of the washing waters; and in the talbotype process, in the exciting silver solution.

Focimeter.—An instrument invented by M. Claudet for measuring the difference between the usual and optical foci of lenses. It consists of eight segments of a circle mounted upon a central axis and arranged about two inches apart, in such a manner that, to a person situated in a line with the axis, the whole should appear to form one disc; each segment being numbered, and having besides several devices and fine lines drawn in different parts for the better distinguishing of the focus. Upon focusing Nos. 4 or 5 accurately upon the ground glass, it may be seen, upon taking a photograph of the arrangement, which numbered segment is in true photographic focus, and then, by simple measurement between the foci of the *optically* sharp and the *chemically* sharp segments, the degree of adjustment for the lens at the given distance may be obtained.

Focus.—The point at which any number of rays meet after being reflected or refracted. This point depends upon the form of the lens, the refracting power of the substance of which it is composed, and the distance of the source of light from the lens. The less convex the lens is the more distant is the focus. The higher, also, the refracting power of the substance of which the lens is formed, the shorter will be the focus. The length of focus also varies with the distance at which the luminous body is situated whose image is formed at the focus: thus, a near object will give a focal image farther off than a more distant object. In speaking of the focal length of a lens, this fact should be remembered, and the focus obtained by forming an image of a body at a great distance off—as the sun, for instance—and then carefully measuring the distance between its image and the lens.

(To be continued.)

The Amateur Mechanic.

GUTTA PERCHA—*(continued).*

Numerous questions have reached us at various times, as to the best lining for sinks, large wooden washing trays, &c. For any of these purposes, gutta percha in various forms possesses many advantages. For large washing trays of wood, varnishing with gutta percha solution will be frequently found sufficient. Mr. Woodward, the patentee of the solar camera for the production of life-size portraits, uses for toning, fixing, and

washing these large prints, trays made of wood lined with paper, and then varnished with a solution of gutta percha in chloroform. Such trays, being water-tight, are found to answer the purpose perfectly well. There are two or three preparations of cloth, canvas, and muslin rendered quite waterproof by a solution of gutta percha, which might be applied to similar purposes. Perhaps the most useful article for such linings is the gutta percha paper, which is prepared, we believe, with an especial view to use on damp walls prior to the application of the usual ornamental papers. It consists of two sheets of paper, between which is rolled, whilst hot, a thin sheet of gutta percha. The three thicknesses thus joined are not stouter than ordinary cartridge paper, and may be applied easily as lining to trays, &c., by the aid of gutta percha solution.

For the lining of sinks, however, which will necessarily be liable to occasional rough usage in the rinsing of plates, &c., the sheet gutta percha itself will often be found preferable. For this purpose, the Gutta Percha Company recommend sheets of not less than 5-32nds of an inch thick. In many cases, we apprehend that would be thicker than necessary; about 3-32nds of an inch, perhaps, being a desirable thickness. As the article is generally sold by weight, it may, perhaps, be of interest to mention the relation of size to weight in sheet for this purpose. A square yard of sheet 1-32nd part of an inch thick, weighs 1¼lbs.; a square yard, 1-16th thick, just about double that weight, and so on in proportion.

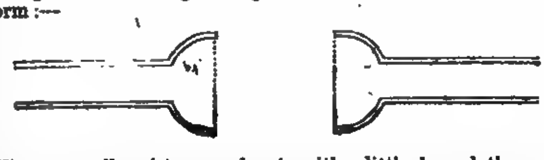
In order to line a sink properly, proceed as follows: cut the pieces the exact size each for its place, sides, ends, and bottom. Fit each to its place, and secure them temporarily with wooden battens placed across. Then take a strip of gutta percha of the same thickness, or a little thicker, and about two inches broad; place it in hot water until it is sufficiently plastic, then dry it carefully, and slightly wipe with a piece of cloth moistened in benzol, so as to secure a perfectly clean surface. With a warm iron now pass gently over each joint of the sheet to soften them, and immediately press the softened strip on to the joint, carefully pressing it close and flat throughout. A secure, neat waterproof joint will be thus effected. It is scarcely necessary here to observe, that where the waste solutions are preserved and the silver recovered, the use of sinks lined with gutta percha presents the greatest facilities for such recovery.

To join gutta percha tubing to such sinks, a circular hole of the same diameter as the tubing should be made. The end of the tubing to be joined should then be placed in boiling water for a few minutes, when it will expand and assume a bell-like form. The unsoftened end of the tubing should then be put through the hole, just leaving the bell-like expansion projecting above the orifice, the sheet immediately around which should then be heated with a piece of hot iron. The softened end of the tubing should then be pressed outward into a flange and brought into contact with the heated surface of the sheet immediately around it, and pressed close and firm. The perfect uniting of the two softened surfaces will be more certainly secured if both are slightly moistened with benzol to ensure the absence of dirt or grease immediately before bringing them into contact.

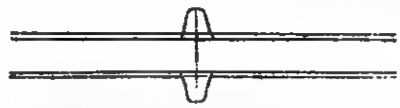
Gutta percha tubing for communication with a sink will frequently require joining to some metal pipe attached to a cistern. The best mode of effecting this is as follows: soften the end of the gutta percha tubing in hot water and then wipe off the moisture, after which slightly warm the metal pipe. The expansion of the tubing will allow the end of the metal pipe to be inserted; the gutta percha tubing must now be kept gently and constantly pressed with the palm of the hand until it is quite cold, when it will be found to form a perfect joint. No bandage or wrapping will be required if these instructions are properly carried out, as the contraction of the gutta percha on cooling gives a firm bite or grasp on the metal pipe.

If the tubing be exposed to the atmosphere, it is desirable to paint it white, which reflecting instead of absorbing the rays of the sun, will prevent the injurious action of the heat on gutta percha.

Where it is necessary to join together two pieces of gutta percha tubing, to gain additional length, it may be done as follows: place in hot water the two ends to be joined until they expand, taking care to prevent the tube from contracting and closing at the point immediately adjoining the expansion. The two pieces of tubing will present somewhat the following form:—



Wipe away all moisture, and rub with a little benzol the surfaces to be joined; then bring together and press firmly the two bell-like ends, which will flatten. The flattened ends must be pressed firmly together with the finger and thumb until cool. They will form a joint something like the following:



The projecting flanges may be neatly pared down, not too closely, however, or it may weaken the joint.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 20th August, 1859.

A new work on photography has just made its appearance in Paris, with the title "Manuel Théorique et Pratique de Photographie sur Collodion et sur Albumine," by M. E. Robiquet. If I were to mention this little book as a practical manual for beginners, I should feel inclined to speak well of it; but if I am to speak of it as a treatise on theoretical and practical photography, I should feel bound to condemn it severely. M. Robiquet has condensed into a small volume of about 300 pages a number of processes, which he has employed himself for some years past, on albumen and collodion. He avows in his preface that he has had no intention of writing a complete treatise, and that his book is chiefly intended for beginners. Perhaps the best I can say of it is, that the work is illustrated; the figures are inserted in the text, and facilitate considerably the comprehension of all the different operations.

M. Robiquet has divided his work into three parts: the first includes all the manipulations for the production of positive and negative proofs, and details on the choice of an instrument. Nothing appears more simple than the choice of a good instrument; nothing is, however, more troublesome. M. Robiquet insists very properly upon the refractive powers of the objective. "If the substance of which the lens is composed is too heavy (as in glass, in which oxides of lead or baryta have been combined), the refractive power is considerable, and these lens must have curves of long radii; the photogenic action that takes place through them is slow, but the images formed are very clear. If, on the contrary, the substance of the glass is very light (as in glass with lime, or oxide of zinc, &c.), the refractive powers are weaker, and that the optical focus shall not be too long, the lens must have curves with short radii, which often occasion aberration of sphericity. In the latter case the images are formed very near to the objective, are strongly illuminated, and are rapidly produced, but they are far less neat than those which are obtained with heavier glass."

M. Robiquet displays his ignorance when he asserts that there exist no mathematical formula for the curves of photographic lens; he regrets that "in this circumstance science is less advanced than industry"(!). The author, before making such a formal and absurd declaration, should have consulted the admirable papers that M. Porro has written upon the subject, and inserted in the *Bulletin de la Société Française*, about a year or so ago.

Again, I cannot forbear condemning a work in which an historical sketch of photography is given, from the earliest times down to the present day, and in which the name of Thomas Archer is completely forgotten!

The second part of the book is entirely devoted to the chemical products employed in photography. This is good, and ably written. Almost the whole of the third division is devoted to the theory of binocular vision, occupying no less than 70 pages, of which three-fourths are copied from a memoir of M. Giraud Teulon. It is, perhaps, the best part of the book, though M. l'Abbé Moigne thinks that the explanations of these phenomena are more clearly given in his edition of Dr. Brewer's "Key of Science."

In conclusion, I repeat, M. Robiquet's work may prove very useful to persons who have no idea of photography, and would give them the means of commencing operations at once. In this respect it may be recommended; but, as a scientific and impartial work on photography, it does not merit two words of praise.

In the *Annali di Chimica*, of Milan, I find a note on two methods of preserving protosulphate of iron in a crystalline state, and of preventing its transformation into persulphate. The first method imagined by Mr. Hoorn consists in this:—The salt is dissolved in a small quantity of water, heated for a short time, and then allowed to cool; whilst cooling, the liquid is kept in constant motion by means of a glass rod. In this manner the crystals that form are excessively small, and constitute a kind of crystalline powder. The latter is dried rapidly at the ordinary temperature of the atmosphere, and by pressing the salt between the folds of filtering paper. The crystalline powder thus obtained is inclosed in a bottle with an hermetic glass stopper, care being taken to fill the bottle completely. On account of the smallness of the crystals very little air can remain in the bottle when filled with the salt in question, and the latter may thus be preserved free of oxidation for any amount of time.

The second method proposed by M. Haakmann, of Rotterdam, consists in placing the crystals of protosulphate of iron in alcohol of a mean density, in the same way as we place potassium or sodium in oil of naphtha or petroleum. When we wish to employ the salt the crystals are withdrawn, placed for a moment in a cloth, and pressed two or three times between folds of blotting paper. The same journal contains an account of a new process for preparing gun-cotton and collodion by M. Bérard. The author attributes the frequent insolubility of pyroxyline in ether to the large mass of the cotton employed in the preparation of gun-cotton. He assures us that the cotton generally employed for this purpose may be advantageously replaced by the *débris* of cotton scraped off or cut away in the manufactories *(tontura di mollettone)*, which is in a state of greater division, and which may be added to a mixture of saltpetre and sulphuric acid; in this manner far more cotton is acted upon by the nitric acid, and two or three times as much may be employed to the same quantity of salt and acid. To 250 parts of sulphuric acid, 100 parts of nitrate of potash and 25 parts of *tontura* (refuse cotton) are added.

To prepare collodion, the author recommends that the gun-cotton, produced as above, should be heated gently in a retort upon a slow fire, with the mixture of ether and alcohol. By acting thus the substance is dissolved more rapidly, and the liquid takes up a greater quantity of pyroxyline than when collodion is prepared by the ordinary method.

A large fountain has been erected on the Place Louvois, in the Rue de Richelieu, at Paris. All the copper ornaments of this fountain have been produced by galvanism. The metallic parts of it appear to be of solid copper, but in reality they are merely coated with a layer of copper, by means of electricity. The work is attributed to M. Oudry, who has had considerable success, it appears, in this ingenious application. The substances to be covered with copper are generally of iron. It is necessary, before plunging them into the bath of sulphate of copper, to rub them with a peculiar substance discovered by M. Oudry, and patented in France and England. They are then immersed in a bath of sulphate of copper, and put in connection with the negative pole of a galvanic battery. After a certain period of time, they are covered uniformly with a coating of copper, that adheres perfectly to the iron, and may be produced to any thickness.

The Minister of War, Marshal Randon, has just issued a decree that reads as follows:—

"Art. 1.—All kinds of phosphoric matches are forbidden in the barracks, under pain of imprisonment.

"Art. 2.—The matches called '*hygieniques amorphes*,' which can only be lighted by rubbing them against a surface prepared to this effect, are alone allowed to be used.

"Art. 3.—Any person, civil or military, that shall introduce other kinds of lucifers, shall be punished."

The intention of the Minister of War is doubtless a good one. The only objection I can find to his decree is, that the lucifers termed *hygieniques amorphes* (and which might just as well have been christened by any other barbarous name), which are said to strike fire only when rubbed upon a peculiar surface prepared to that effect, *can* be lighted when rubbed upon any hard substance, such as stone, glass, &c.

M. Boettger has made known a new re-agent, which will, perhaps, become useful in the analysis of gases. It consists of strips of paper or cotton imbibed with chloride of palladium. These strips are suspended in any gas whose nature we desire to investigate. The gases which colour the chloride of palladium with which the slips of paper are imbibed, are oxide of carbon, proto-carburet of hydrogen (marsh gas), olefiant gas, and hydrogen. It is necessary that the chloride of palladium be pure, or, at least, as exempt from any free acid as possible.

Henri Rose has discovered that alkaline formiates have the property of transforming bichloride of mercury into protochloride, and if the formiate is employed in large quantities, the chlorides are reduced to metallic mercury. This reducing action does not take place if the solution contain any other chlorides at the same time.

The French possessions in Algeria have made the acquisition of a new and useful plant, the cultivation of which promises great success. It is the *wax plant of Cayenne*, known also as the *Goingamadon*. This plant furnishes wax in every respect similar to that which is at present procured from bees. Its cultivation in Algeria is neither difficult nor expensive. It is calculated that each plant, after attaining its ordinary growth, will furnish from 40 to 50 lbs of wax.

THE ISLE OF WIGHT FROM A PHOTOGRAPHIC POINT OF VIEW.

To the Editor of the "Photographic News."

Sir,—As regards Ventnor itself, there is little for the photographer to do in it; but round about it there are many scenes of great beauty calculated to make admirable pictures. If it had been possible to have planted my camera at a sufficient distance right in front of the town, so as to have obtained a negative of the town itself, with the high hills at its back, I should have secured a picture superior to anything of a similar description I ever saw; and this would apply still more strongly to Bonchurch, but the difficulty of getting a sufficiently stable base for the camera on the sea rendered it an impossibility. I should imagine that out-door photographic operations might be continued here much later than in almost any other part of England, from the greater mildness of the temperature consequent on its sheltered situation. In the gardens may be seen the myrtle, and other tender plants, which survive in the open air all the year round; and it is this mildness of the temperature which has led to its being chosen as the winter abode of young and suffering invalids, many of whom have found a resting-place here from which they will never depart. By going along the beach from Ventnor to

Niton, many curious and pretty views can be obtained, which I value chiefly, however, on account of their uncommon nature; but the journey which I subsequently made from Niton to Ventnor along the highway gave me the most opportunities for getting pictures which were more attractive to the generality of the people. Occasionally, it was a fine house, almost buried amidst the foliage of the surrounding trees; then a cottage, which, with the accessories surrounding it, gave a most delightful picture, and this was hardly passed before I came to a landscape diversified by hedges, trees, and cattle lying about beneath their shade, to screen themselves from the burning rays of the sun. It was while taking a picture of a cottage along this road, that I met with a circumstance which showed me in an unpleasant manner the difference in the energy of rays reflected from objects of one colour, from the energy of rays reflected by objects of another. I had selected for a picture a pretty thatched cottage, partly hidden by the leaves of an apple or pear-tree, and having on one side of it a field of clover, in bloom, and on the other a small patch of what the woman called "chorlick." I am not strong in botany, and therefore cannot give your readers the scientific name of this plant; but it is a plant covered with brilliant yellow flowers, and showing scarcely any leaf. I exposed a plate, prepared by Fothergill's process, for the length of time which experience had taught me to be necessary on such a day and hour, and never doubted that I had been as successful as usual; but, on developing, I found that the negative was useless, in consequence of the parts of the plate on which the chorlick ought to have imprinted itself being almost entirely blank, whereas, the remaining portion was even more than usually good.

Niton is a pretty little village, which, like most other places in the Isle of Wight, is gradually extending itself. There was no object in the place which I thought worth taking beside the Sandrock Hotel, which is a very pretty building on the Undercliff, and the church, which is very picturesquely situated, and, apparently, is one of very old standing—almost as old as the family of the Hoglanders, who are said to have come to the island in the time of William the Conqueror. Though I could obtain no very striking pictures of objects in Niton itself, yet the country round offered many scenes of great beauty, many more than I, with the best will in the world, could afford to take just at that time, owing to the rapid manner in which the number of my plates was diminishing; not that there was any difficulty in getting a fresh supply sent to me, but that took time, and I could not wait at Niton until they arrived. There was one place I visited from here, and which I would recommend any of your readers who may follow in my footsteps to visit, and this was St. Catherine's Hill. It is rather toilsome work to reach the summit on a hot day, it being more than 800 feet above the level of the sea, but the view from it amply repays the fatigue. Not only can you see the greater part of the island, but also the New Forest, and a great part of Hampshire, and along the coast as far as Beachy Head. I had been told that I might even get a view of the more elevated parts of the coast about Cherbourg; but though the day was very brilliant, and I carried a good glass, I did not succeed in seeing what others tell you they have seen; but I certainly did get a view which I think it would be difficult to meet with in any other part of the United Kingdom. As I sat there, looking sometimes at the hill and dale, which extended for miles, and then at the bright green flashing sea covered with sails, I almost fancied I could hear in the wind—which was blowing strongly there, although not a breath of air was perceptible when I left Niton—the sound of the voice of the monk chanting, who is said to have formerly lived in a chapel erected here some 600 years ago, and whose duty it was to keep lights burning as a beacon to the ships—a purpose it must have accomplished in a very indifferent manner, if the climate of England were then what it is now, as the hill on which it stood is frequently enveloped in mists and fogs; so frequently, indeed, that, to make a lighthouse on that part of the coast of use, it has been thought advisable to erect it on a point of land much lower down. The man who lives in it is anything but indifferent to the sight of his fellow-creatures. I happened one day to be examining the lighthouse at the moment when a steamer, full of people, was coming along very close to the shore, and I could see him pull aside the blind to look out, and wave his hand vigorously to attract the attention of those on board.

From here, along the coast, there was not much to attract attention, until I reached a point called Rocken End. This is a long ledge of rocks which stretch far into the sea, and are almost covered at high water, the tide breaking against them with great force, especially when aided by a high wind. It so happened that the tide was just beginning to flow when we got there, so that I was able to get two negatives from different points of view before the sea had risen too high. I would advise those who can choose their own time for visiting this part to do so when the tide is running in, the roaring of the water among the rocks being very impressive. From this point, until I reached Black Gang Chine, I saw few views I considered suited for the camera; at the latter place, however, I was delighted by a spectacle, the like of which is not to be found in any other part of the island. Those who remember the description of the Chine published in my letter of last week, may imagine that this resembled it, but it did not in the least. The sides of Shanklin Chine were clothed in verdure, whereas the whole appearance of Black Gang Chine is one of barrenness and desolation. In this, as in the other, the stream of water which falls from the top is very thin, except after a heavy storm, at which time the whole thing is seen to the greatest advantage. The colour of the sides of the chine renders the photograph a more than ordinarily faithful interpreter of the scene, as it can be toned to a colour very closely resembling the reality, and it is in other respects admirably fitted for a photograph of large size. On the night of the day on which I was there, there was some exceedingly vivid lightning, and I was fortunate enough to see it under an aspect more favourable to the enjoyment of its peculiar beauties than falls to the lot of most visitors to the place.

From Black Gang I found it necessary to go to Newport, from which town I made two excursions to Carisbrooke Castle, which is only about a mile distant. Of course I took pictures of the entrance gateway and the two round towers which formerly defended it, and also of the remains of the building which still contains the window—or rather the stonework and iron bars, for the glass has disappeared—through which King Charles is said to have tried to make his escape and stuck in the attempt. The adjoining building, said to have been the governor's house, in which Charles was confined subsequent to his attempt, is included in the negative, but there is nothing very interesting in its appearance. It is inside this you see that travellers have indulged the mania for writing their names to its fullest extent. Every inch of the wall is covered with the names, and sometimes the addresses, of persons who have visited it, one lady from America having inscribed hers about ten times; others have added to their names a scrap of doggrel poetry like the following, written by an individual who modestly subscribes himself as the Queen's Osborne poet:—

> "Dear old Kingsland, though far from thee we roam,
> Yet me and old Chapman will soon be at home."

The inscriptions, though, which are peculiarly adapted to send a thrill of envy through the bachelor bosom, when he finds himself reading them alone and solitary on a bright sunshiny day, are those which inform all comers that Edwin and Emma Ringdove, or Edwin and Angelina Turtle, visited this place in the course of their wedding tour. Inscriptions like these are very numerous, and would seem to prove that the Isle of Wight is a favourite resort for newly-married couples; probably from their feeling that they will be more

isolated from the world in a little island than they would be on the mainland.

The ruins of the keep make a very pretty picture, but the only way which I could perceive at the time by means of which it could be got at favourably, was from the upper window of a building facing it; but from what I remember of the appearance of the land surrounding the ramparts, I am inclined to think a better picture might possibly be obtained from the outside of the castle walls, which did not occur to me then. I do not think there is any other view than those I have mentioned worth taking, so the photographer, who will probably make a journey expressly from Newport, need not overburden himself with plates. He may, it is true, pay a visit to the village of Carisbrooke and take a negative of the church, which is rather a fine old building, but the interior of which is not worth the trouble of taking, more especially as it is disfigured by high pews, or boxes, of unpainted deal, or some other common wood.

I did not observe any building in Newport capable of yielding a picture with the exception of the church, and this, in the presence of so many interesting objects in the country around, is hardly worth the expenditure of a plate. As a country church it is certainly a very fine one, and the inhabitants of the Isle of Wight are justly proud of it; but the great attraction it contains is a white marble statue of the Princess Elizabeth, daughter of Charles I., by Marochetti, executed by order of the Queen. The expression of the youthful countenance is exceedingly gentle and pleasing, in which it agrees with the character which is given of her. She is represented in a recumbent position, with her head resting on the Bible—the position in which she was discovered after death. The sternest democrat can scarcely repress a feeling of indignation against Cromwell and his advisers for having shut up and suffered to pine to death in a prison a young and peculiarly gentle girl, whose only offence was that she was the daughter of her father. The statue would make a very pretty and interesting stereoscopic picture, and as I know I could have got permission to take a negative of it, I have no doubt that anybody, less idly disposed than I was just at that time, could do so likewise. There would be no difficulty on the score of want of light.

Not caring to remain in Newport, I took a conveyance to Mottestone, where I stopped to take a look at the church, which is a very old one, and rather picturesque in appearance, partly from its age, and partly from its having been built at different times. After this, I went on to Freshwater, where I remained for the night. The next morning I was stirring betimes, and before I breakfasted had taken four negatives, without moving any great distance, three of which included the church and other objects taken from different points of view. Finding there was nothing more worth taking, I had my traps carried down to Freshwater Gate, which is a better place to stay at than the village where I had slept, being open to the sea, and offering advantages in the shape of bathing, as well as in accommodation—considerations to which photographers are as sensible as other people. Moreover, there are several views about here which are very interesting, and among these, that of the place itself, which will furnish more than one good negative. My attempts to get a negative of some of the caverns which the washing of the sea has worn in the cliff were failures, which I ascribe to the dullness of the weather when I made the attempt. I was more successful, however, in the case of the cavern called Freshwater Cavern, which is of considerable size; the entrance being, I imagine, about 40 feet in height, and the cavern itself extending a good way into the cliff.

I also tried to get a picture of some rocks which rise from the sea at a short distance from the beach, but was not successful. The dry process is of no use as regards water in motion, and even with the wet collodion process I have never been able to get pictures of the waves at all comparable with those exhibited by you at the South Kensington Museum.

I must now conclude this second letter; and in a third I will endeavour to conclude the account of my wanderings in the Isle of Wight. IOTA.

Photographic Societies.

The French Photographic Society.

At the last meeting of the French Photographic Society the chair was taken by the President, M. Regnault, who, after certain routine business had been disposed of, announced that, with the permission of the Minister of State, the Photographic Exhibition, which had been even more successful than they had hoped, would remain open until the 31st August, and consequently the Report on the Exhibition could not be presented until after the vacation.

MM. Davanne and Girard have addressed the following letter to the Society:—"M. President,—Have the kindness to receive and present to the Society our thanks for the honour done us in the award of a gold medal at the last meeting. Though our studies on positive proofs are far from complete, the Society has given us a handsome recompense as an encouragement. We still continue our labours, which will probably occupy us for some months longer, those in course of execution leading us to hope that we shall attain the object in view—the uniformity and permanency of positive proofs."

The President requested that those persons to whom the Society had awarded medals at its last sitting would call for them at the secretary's office.

M. Poitevin presented a proof printed on paper with printing ink in July, 1855, also of a series of photographic proofs pulled at different epochs of the application of the process. To these he added some taken by his gallate of iron process. The proofs were handed over to the Luynes commission.

MM. Salmon and Garnier handed in a paper on their printing process by the deposit of carbon on sheets of paper impregnated with sensitive substances, and on divers heliographic processes on metals and stone, together with specimen prints; which were likewise sent to the Luynes commission.

M. Pretsch, of London, forwarded a fresh series of proofs and plates, obtained by his photo-galvanographic process. (Sent to the Luynes commission.)

M. Berchtold read a paper on the process of heliographia engraving, communicated by him at the last meeting, and illustrated it with proofs and plates prepared by him. He received the thanks of the Society for his communication, which was forwarded to the commission.

M. Asser, of Amsterdam, sent a note on his process for transferring on stone or metal photographic negatives on paper prepared with lithographic ink, also some proofs obtained by it. (Forwarded to the commission.)

M. Lafon de Camarsac read a paper on the subject of his processes for obtaining photographic pictures, similar to that which we published some weeks ago. The paper, together with proofs and specimens, was forwarded to the Luynes commission.

M. Civiale presented the following remarks on the diminution in the time of exposure necessary in the waxed paper, and dry albumen and collodion processes:—"I have been led to make the following experiments from remarking the rapidity which is communicated by the presence of free nitrate of silver on the surface of humid paper, and I have endeavoured to put the waxed paper (after its exposure to the light) pretty nearly in the same condition as humid paper; and the same also with respect to the dry albumen and collodion, by comparing them with wet albumen and collodion. The preparation of the waxed paper was the same as I described last year. The sensitised paper, being properly washed and dried, was exposed from two to four minutes and a half. This result was obtained by plunging the proof after exposure in the sensitising aceto-nitrate bath. The proof remained completely covered for ten seconds, when I transferred it to the gallic acid bath.

Distilled water	1,000 parts.
Gallic acid	3.5 „

The proof was completely developed in a very short time. Dry waxed paper thus treated, presents the advantages and drawbacks of wet paper—greater rapidity joined to a little more hardness

and instability in the results, especially in dull weather. I believe the greatest precautions are necessary to avoid spots; the dishes should be scrupulously clean, and the paper carefully selected and recently iodised. I have not been able to get good negatives with paper that had been iodised more than two days. Possibly some improvement might be made in the bath, and other processes than that I have indicated might give equal rapidity. As to the dry albumen and collodion by wetting their surfaces, after exposure in the silver bath, the rapidity will be nearly equal to the wet process."

M. Regnault thought it was dangerous to employ silver in the development, it gave a hard appearance to the negative.

The Abbé Laborde offered some remarks on the experiments made by M. Niépce. (See p. 289.)

At the conclusion of this communication, M. Regnault observed that the phenomenon indicated by M. Niépce may be of a very complicated character; for example, the paper itself might intervene by its proper substance. He believed that the following experiment would be necessary to demonstrate the exactness of M. Niépce's hypothesis. The interposition of a lens of short focus between the two surfaces, to concentrate the rays on a single point: in this case, the concentrated rays ought necessarily to act with much more energy. It was to be presumed that the action was due to the proximity of the two surfaces rather than to a luminous radiation.

The thanks of the Society were given to M. Laborde.

A note, of which the following is the substance, was also communicated by the same gentleman. He had often observed a fact, which had, no doubt, attracted the attention of other photographers; which was, that if, after having focused with a small diaphragm, this diaphragm be removed, and the object glass left with its entire opening, the image becomes confused, not only for reasons already known, but also because the ground glass is no longer at the focus; to obtain all the requisite sharpness it will be necessary, under these altered circumstances, to approximate the glass slightly towards the object glass. The only way in which this information is useful to photographers is in cautioning them of the necessity of focusing afresh when they remove a small diaphragm after having taken an object, to use the entire opening to take a second picture of the same object with greater rapidity.

M. Bertsch presented an improved double object portrait lens on the part of M. Voigtlander, also "a small orthoscopic objective for the stereoscope, giving with a focal distance of 11 centimetres a half-plate image, the lines of which undergo no flexion on any part of the field."

Mr. Woodward, of Baltimore, presented a note on the subject of his solar camera, which was read, and the thanks of the Society accorded to him for it; after which the meeting was pronounced at an end.—*Condensed from the Bulletin of the French Photographic Society.*

Miscellaneous.

Photographs of the Cartoons.—When the art of photography first began to attract attention, rather extravagant expectations were formed by some of its votaries as to the triumphs which it was one day to achieve. It would, it was said, drive painting—at least the painting of portraits and landscapes—out of the field. It must be now generally admitted that such a notion as this was very greatly exaggerated. A fine art can never be expelled by a mechanical art, and, in spite of all that has been said in its favour, photography is essentially of the latter kind. In the fine arts, taste and imagination, are the prime requisites—in the mechanical, judgment and technical skill. And though in photography there is some room for the display of taste in the selection of subjects and points of view, there can be no doubt that skilful manipulation and close observation of physical phenomena have much more to do with success. It is the privilege of the fine arts to defy, in a certain sense and to a certain degree, the attacks of time. As a beautiful painting fades, as a stately building crumbles into ruin, as a graceful statue becomes discoloured or mutilated, each seems to acquire, from the decay which it has suffered, a new and nameless charm. The spirit of the fashioner seems to reveal itself with new force and purity, in proportion as the material of the thing fashioned perishes. In photographs there is nothing of this kind. They must be fresh, and sharp, and clean; and the age which robs them of these qualities can give nothing in their place. Not only, however, did some of the vaunters of the art of photography forget the imperishable distinction between the fine and the mechanical arts, but they were, and indeed still are, fond of attributing to their pet pursuit a quality which belongs to it only with important limitations. Photography, it has been repeatedly said, must be true. The fact is, that it would be nearer the mark to say that it must be false. It is false in two ways. Objects at different distances are unequally represented, and lights and shadows are exaggerated. The former of these imperfections may, indeed, be reduced to a very inconsiderable quantity, but it nevertheless always exists; and, wherever minutiæ are of importance, it will operate disadvantageously. The distaste, therefore, which most persons feel for photographic portraits, and which has become an almost proverbial illustration of human vanity, is, in fact, a well-founded distaste for a real misrepresentation. But, though the capabilities of photography, as generally happens with a new invention, have been sometimes rated too highly, it is impossible to deny that it is a very valuable and important discovery. It is true that the higher kinds of painting have nothing to dread from such rivalry, as has been imagined, but it is no less true that photography is sometimes a useful substitute, and frequently a useful ally. A daguerrotype may not be equal to a good miniature, but it is much better and much cheaper than a bad miniature. In landscape, too, there are some respects in which the artist cannot hope to rival the photograph, as, for instance, in the representation of the forms of mountains and complicated masses of rock, photographic transcripts of which are not only beautiful in themselves, but very valuable aids for artistic study. Of all the applications of the art of photography, however, the most unimpeachable is its employment to secure fac-similes of perishing inscriptions, engravings, and paintings. Here the surface is flat, and there is consequently no difficulty as regards the focus; and we can rely upon an absolute fidelity to which the labour of man, however conscientious and however well-meant, can never hope to attain. It is probably no exaggeration to say that the most successful and striking instance of this application of the art which has yet been seen is the series of copies of the cartoons which has been recently executed by Messrs. Caldesi and Montecchi, and published by Messrs. Colnaghi. Three sets of different sizes have been issued, of which, if we are not mistaken, the largest was displayed at the Photographic Exhibition in Suffolk-street, last winter. Besides these three sets there is a series of heads of the size of the originals, in which Raffaelle's manner of working can be conveniently studied. Of the three editions of the entire cartoons, the largest set gives the best notion of the originals, as in the more reduced impressions something of the breadth and grandeur of effect seems to be lost. On the other hand, the latter are rather more portable and convenient, and are, of course, just as correct. Whichever set is selected, the lover of art cannot fail to feel the highest gratification at being thus enabled to investigate at leisure these acknowledged masterpieces. It has often been said that a painter cannot be fairly estimated by his oil-paintings alone, and that, to estimate properly the grandeur of design of which he is capable, his frescoes and works in distemper, if he has executed any, must be taken into consideration. Certainly, if it were not for the cartoons and the decorations of the Vatican, we should form a very inadequate notion of the genius of Raffaelle. Never till now, however, have the wonderful variety, power, and beauty of the former been fully revealed. Often as a person may have looked at the originals, we venture to assert that he gains a new sense of their excellence in contemplating these photographs. This is not only because they can be examined more closely and carefully than the originals, but because they seem, in fact, to have acquired a force and freshness which the latter want. The truth appears to be that the very tendency to exaggerate light and shade which is the main defect of the process when applied to copying nature, is for such purposes as the present the very thing that is wanted. All that is requisite for the felicitous reproduction of faded and injured works of art, like the cartoons, is a sure and proportionate intensification of light and dark; and this is precisely what is

produced in photography. The cartoons seem accordingly to have been submitted to a Medean bath, and the figures come out young and fresh—the expressions of the countenances especially having acquired a character which, if it can be traced, as it doubtless can, in the originals, does not at any rate declare itself so plainly. Something is perhaps due to the fact that they are here upon a reduced scale, as the same relations of light and dark would naturally appear less inadequate when upon a small scale than when upon a large one. There does seem, however, to be, apart from this, a real restoration, which can only be attributed to the exaggerative tendency of the process. The cartoons have been so often discussed and described, that it would be superfluous to dilate here upon their merits. It may safely be assumed that no change of taste can now lessen the esteem in which all competent judges hold them. It is, however, curious to find that, at no very remote time, they were criticised in a spirit which is now obsolete. There is published in the collected edition of Sir Joshua Reynolds's Works a paper which he contributed to the *Idler* upon false criticism. He gives an account of a visit which he and a professed connoisseur paid to the cartoons, and describes the sort of comment which the latter passed upon them. "What a pity," he exclaimed, "that Raffaelle lived before the art of contrast was discovered! What an addition to the nobleness of St. Paul's figure could he have given had the art of contrast, and, above all, the flowing line which constitutes grace and beauty, been known in his time! You would not then have seen an upright figure standing equally on both legs, and both hands stretched forward in the same direction, and his drapery to all appearance without the least art of disposition." Of "The Charge to St. Peter" he remarked "Here are twelve upright figures. Now, if Raffaelle had been acquainted with the pyramidal figure, he would have contrived the figures in the middle to have been on higher ground, or the figures at the extremities stooping or lying, which would not only have combined the group into a pyramid, but would have given contrast." This anecdote had probably no foundation in fact, but it serves to show that this kind of criticism was in vogue, and the cautions upon this head which Sir J. Reynolds gives in his lectures prove the same thing. The cartoons are happily no longer necessary to aid in freeing popular taste from such æsthetical red tape as this; but the impressions which Messrs. Colnaghi have published are not the less valuable. They will be exceedingly useful to artists, and exceedingly interesting to every person of cultivated taste. Most children first acquire a notion of, and a taste for, art from illustrations of Bible history, and those illustrations will henceforward be, in many cases, the masterpieces of the greatest of devotional painters.—*Saturday Review.*

THE ARCHER FUND.—The sum subscribed for the benefit of the family of the late Mr. Archer amounts to about £640; to this must be added a pension of £50 a-year granted by Her Majesty out of the civil list. Sir William Newton is endeavouring to obtain a parliamentary grant of £100 a-year in addition, so that each of the ladies may be ensured an annual income of £50; which he considers to be the least they have a right to expect, seeing, as he affirms, that their father's discovery of collodion saves the country £30,000 a-year. The subscription list is still open, if any of our readers are desirous of contributing to the fund.

THE ART UNION OF MANCHESTER.—The idea of Manchester, which the generality of people entertained until recently was, that it was a city of factories enveloped in smoke, where steam-engines filled the streets with a continual roar, and the mass of the inhabitants of which held strong opinions as to their political rights, and were, in consequence, regarded with a species of horror by the quiet dwellers in country towns. However, the attendance of the people at the Fine Arts Exhibition of the past, and the existence of an Art Union in the present, are proofs that those in that city who are not included among "the upper ten thousand," have a taste for art as well as for politics. Besides the usual engravings and the other advantages which the Art Union of London offers, the Manchester Art Union proposes to add a certain number of choice photographs for distribution among their subscribers, and to ensure that the photographs shall be good ones, they request that photographers who may be able to comply with the conditions specified in an advertisement which appears in the current number of the "PHOTOGRAPHIC NEWS," to forward specimens to the secretary. Probably there is no art whatever which is practised so extensively, for the mere pleasure of practising it, as photography. Still there are a vast number of photographers who, if they do not seek to sell their productions under ordinary circumstances, would be happy to do so when the transaction is so extensive as the present promises to be, and it is therefore with considerable pleasure that we call attention to the action of the Manchester Art Union in this matter, which we think is calculated not only to give pleasure to their subscribers, but to encourage an art that, though of continually increasing importance, is of all others the least encouraging in a pecuniary point of view.

Photographic Notes and Queries.

NEW DRY PROCESS.

SIR,—I was by no means agreeably surprised, on receipt of your No. for the 12th inst., to see that a "Friend" (vol. ii. p. 275,) had indiscreetly entrusted you with mems. touching a process which I have been expounding and communicating to several, during the last two months; and which, being apparently so slight a modification of Fothergill's process, I really wished more fully to elaborate before I *rushed* into print. I recognise the style of your correspondent, and feel certain he has not in any way experimented with it; his description of it is very inaccurate, and his deductions wide of the mark. Syrup, of the density he mentions, would act in a manner totally the reverse of that intended. I never said that "nine batches" of plates had been prepared; but, that, out of nine plates from different batches, I had met with no failure which could be ascribed to the process. Far from "the negatives not being as dense as usual," I had the pleasure yesterday to see a copy of an engraving, the especial beauty of which consisted in the perfect density of the spaces which were white in the original, and a certain peculiar sharpness of outline which is rarely reached in wet collodion.

Allow me now to describe the process more minutely than "Amateur," and if there be any virtue in it, your readers may judge for themselves by experiment; if any praise be due, they will know to whom to award it.

1. The collodion I have used is the same I have long made and sold for the ordinary wet process; and the bath the usual nearly neutral 30 grain, saturated with iodide of silver.

2. After exciting a plate (say stereo size), place it on the level stand, and pour over it 6 drachms of the following solution—(lump sugar, 1 drachm; pure water, 1 ounce). Effect this with one sweep of the hand, so that the liquid shall flow over in one unbroken wave, and let it remain at absolute rest for one minute; the liquid being then caused to move to and fro repeatedly over the plate, is to be poured off, and replaced

3. By 4 drachms of prepared albumen, made by agitating, in a bottle, 1 ounce of albumen, with 3 ounces pure water and 5 minims liquid ammonia, sp. gr. 880, allowing it to settle 12 hours, then filtering through paper.

The object in adding the sugar to the washing water is to render the latter somewhat denser, so that the portion of bath remaining in the pores of the collodion, which, independently of gravity, appears to exhibit a sort of repulsion for plain water, and their potation in general, may have its yearning for union with a more generous liquid readily satisfied; which is the case if it be allowed to rest undisturbed for a short period, as above described.

4. The albumen must be allowed to remain on the plate whilst another is being coated and immersed in the bath, and then

5. Washed off with 1 pint of common water.

6. The plates are to be allowed to drain and become nearly dry with the *inferior* angle supported on blotting paper, resting on glass; the *superior*, by a piece of white pine wood, appropriately serrated, and nailed at the proper height against the wall. Perfect desiccation must be effected by the aid of low artificial heat, radiating from any appropriate

source, *e.g.*, a chamber of hot water, or a heated brick wrapped in blotting paper.

7. I consider the exposure to be about five times as long as wet collodion—half a minute is sufficient for an object, 50 yards distant, well illuminated by the sun. Lens, a double combination, 5-inch focus with a stop, ⅜-inch between the lenses. The reproduction above mentioned occupied 22 minutes, as against 5 with wet collodion.

8. Before developing, plunge for half a minute into distilled water, then place on level stand, and

9. Pour over the plate 4 drachms of the following:—1 grain usual pyrogallic solution, 6 parts saturated gallic acid solution, 1 part mixed at the moment of use with 1 per cent. of a 30-grain nitrate of silver solution, in a glass measure, perfectly clean and free from scratches. The addition of gallic acid renders the development somewhat more tardy, but this is abundantly compensated for by the liquid remaining so much longer bright and the diminished tendency to stains.

10. Within 5 or 10 minutes all the detail of the picture will have appeared, provided the exposure has been sufficient; but the density will be but small; any amount of the latter may be obtained by using a new quantity of developer mixed with 10 drops or more of silver solution.

11. I invariably fix with cyanide, 5 grains to the ounce, finding that it does its work in a more cleanly manner than hypo., and has no tendency to insinuate itself under the film in places where it may have been scratched off the edges, &c.; a fault to which the latter is much addicted.

12. With respect to the remedies against blisters and peeling off of the film, I cannot say much, not having been troubled therewith. I believe them to arise frequently from an inappropriate collodion being used, but more generally from careless manipulation; that above mentioned being a very grave source of peeling; frequent raising of the plate perpendicularly on its edge has a great tendency to favour this. Much stress is laid by some writers upon the difficulty of inducing cleanliness in the plates to be used for this purpose, and the dire results supposed to follow from want of this *approximate* to godliness. I am not of their opinion; their failures evidently proceed from other causes. I differ from them also, totally, in their belief that smearing them over with albumen is a mode of keeping either these or the bath clean. Let the plates be first well washed in solution of cyanide, well rinsed in water, and dried; then, just before using, smeared over with a thin cream, consisting of tripoli, proof spirit, and a little ammonia, and the same subsequently buffed off; and I will answer that dirty plates shall no longer be reckoned among their stock grievances.

13. This process appears also likely to solve the difficult question of the manufacture, on the large scale, of transparencies for the stereoscope. I have made a few experiments thereon with the happiest results. Almost any tint in the deposit may be obtained by the judicious dosage of the gallic acid solution. The negatives employed should be slightly over-exposed, and not too dense in any part. The exposure in pressure frame is 2 seconds, to moderately good diffused light.

J. B. Hockin.

38, *Duke Street, Manchester Square.*

NEW DRY PROCESS.

Sir,—In my letter of last week (*ante*, page 275), there is a mistake which requires correction. The syrup may be prepared with one ounce of sugar to one of water, as stated by me; but in that case, it should be diluted to the consistency of one drachm of sugar to the ounce of water. This proportion has been found to act well, but perhaps one measure of syrup to three of water may be quite as good.

I shall feel obliged if those who try this process will report their opinion of it, or communicate any modification which they have tested, and found to be an improvement. By so doing, they will be aiding the advancement of an art which can only attain perfection by such means. The idea of interposing a delicate layer between the collodion and albumen is a happy one, and I trust this new process will prove as successful in the hands of photographers in general as it unquestionably has in those of its author.

An Amateur.

CONVERTING POSITIVES INTO NEGATIVES.

Sir,—The remarks of Mr. Hardwich, in one of your recent numbers, relative to the comparative value of the processes for strengthening negatives, induce me to write to you to add my confirmatory experience of the value of the process favourably alluded to by Mr. Hardwich, and originally introduced by MM. Barresville and Davanne, viz., that in which iodine is employed for reproducing the iodide of silver, and pyrogallic acid is used in strengthening. I called attention to this process in one of your contemporaries in May, 1857; since then I have always employed it when I have required a negative, and with uniformly good results. I also know several photographers who find it very valuable to them. One of them has informed me that, previously to using this process, he had to expose often 15 to 30 minutes to obtain a good negative of machinery, &c., in badly lighted rooms, and now a minute or two produce him a positive picture, that yields a beautiful negative, by this mode of treatment. I inclose you a print from a converted positive, obtained in this way, and you will see the advantages of having a process you can depend upon, when you have such subjects to take. I can, therefore, strongly recommend this process to any who require to obtain negatives of objects in a bad light, or when the exposure for an ordinary negative would be too long to obtain a satisfactory result, from the objects moving (as children, animals, &c.). The formulæ and manipulation I use are as follow:—

After fixing and washing the positive picture (which should be fully developed with the iron solution), *thoroughly dry it*. This is to prevent the film coming off in the after washings, &c. Then moisten the film well with water, and pour over some of the following solution:—compound tincture of iodine, 2 drachms; distilled water, 8 ounces; pour the same quantity on and off the picture for a minute or two. In some collodions, or with some developers, no change is observable here, in others a pale primrose iodide covers the "whites" of the image. Well wash off the iodide solution with water, and expose the plate to the light for a short period, say 30 to 60 seconds; return to the dark room and pour on some of the following:—

Pyrogallic acid	2 grains.
Citric acid	1 grain.
Distilled water	1 ounce.

When the plate is well moistened with this, pour it back into the measure and add a few drops of solution of nitrate of silver, 30 grains to 1 ounce. This should not be from the ordinary nitrate bath, or specks will probably be the result. Pour this same mixture of pyrogallic acid and nitrate of silver on and off the plate as in developing a negative, till the picture is dense enough, of course using a fresh quantity, if the first lot gets very much decomposed and discoloured. My only excuse in troubling you with these remarks is, that I consider, from the experience of others and my own, that this process for strengthening negatives, or converting positives into negatives, is so good that it needs only to be known to be generally adopted.

Robt. John Fowler.

NOTE ON THE DEPOSITION OF DEW.

Sir,—I am no photographer, but I have taken the "News" from the first, and reading in a recent number your foreign correspondent's extract from *Le Cosmos*, the idea struck me that the phenomenon there mentioned might be similar to one I have often noticed, with the difference only between dust and dew. The season is now approaching when, if you are a tolerably early riser, you may, any morn-

ing you choose to go out, see, by the deposit on fences or any other erection of wood, the arrangement of the frame-work supporting the erection as clearly as if the framing were uncovered. C. R. Plant.

DETERIORATION OF GUTTA PERCHA ON KEEPING.

Sir,—As you are now writing on gutta percha baths, I think it would not be amiss to mention my experience with one. I made one of sheet gutta percha in March, 1857, which answered very well till a few weeks ago, when it sprung a leak, which I could not find without taking it out of the mahogany case, and when I attempted to do so it broke all to pieces. I then looked for a piece of the new sheet it was made from, and that was just the same—as brittle, but not so strong as glass. Have any of your correspondents experienced the same? I ought to state that I only used it a few hours once a week. Henry Mitchell.

MARBLINGS IN THE FOTHERGILL PROCESS.

Sir,—The water marks or marbling in Fothergill's process are produced by the mode of washing off the albumen, and will mostly be found when it is washed off under a tap or jug. A metagelatine plate, unwashed, will never show them; but wash off the metagelatine as above, and you will frequently meet with them. Washing in a dish entirely prevents them, if sufficient water is used: 1 oz. of albumen to 5 ozs. of water is quite sufficient. Success.

QUERY ON COLOURING PHOTOGRAPHS.

Sir,—Can any of your readers inform me what chemical process will produce the bronze shade on the extract of safflower, as it would be most valuable for colouring stereograms? G. R. G.

ANSWERS TO MINOR QUERIES.

Wet Collodion for Interiors.—Mr. Russell Sedgfield, on whose beautiful productions we have had on more than one occasion to offer some remarks, suggests a process by means of which wet collodion may be employed for interiors. The chief objection to the use of this process for interiors is, that, in consequence of the lengthened exposure required, the nitrate of silver dries on the surface and produces stains. To overcome this drawback he prepares a bath of ten or twelve grains of nitrate of silver to the ounce and nearly saturates it with acetate. On removing the plate from the usual bath, he places it in this for several minutes. For developing, he uses a pyrogallic acid solution, of two or three grains to the ounce. The development occupies a longer period than in the case of a plate prepared in the ordinary manner in one bath only, except when the exposure has been a very long one, viz., from ten to fifteen minutes. The advantages claimed for this modification of the wet collodion process are, the diminution of risk of stains and the power of giving a longer exposure with safety. The collodion Mr. Sedgfield recommends for interiors is one that is a medium between the tough and powdery: a condition he obtains by the addition of cotton and alcohol to the collodion supplied to him. It should be newly mixed for interiors, and iodised with a mixture of cadmium and potassium.

Expense of Toning with Gold.—A toning bath used in the way we recommend, viz., *before* fixing, but after removal of the free nitrate of silver from the print, will tone properly about 200 square inches for every grain of chloride of gold which has been added to it; and the expense of chloride of gold being about two pence per grain, it will be seen that the real expense of gold toning does not exceed one penny per 100 square inches. This being the case, no photographer who really values his productions should run the risk of having them fade, owing to an erroneous impression of the costliness of a properly made toning bath.

TO CORRESPONDENTS.

A. Taylor.—1. Many thanks for the note respecting the injurious effects of the washing waters on plants: the letter from a correspondent, which we published in our last number, renders further notice on this point unnecessary. 2. We will communicate the query to our correspondent, who, doubtless, will render every information in his power. 3. An excellent composition was given in our first volume; a reference to the index will at once shew you where it is to be found. 4. They should be well washed immediately they are taken from the printing frame, and then immersed in the toning bath; from the colour of your print, we fancy that your toning bath is not in good order.

Excelsior.—Did you wash the plate well after developing, and before fixing? If cyanide fixing solution is applied immediately after an iron developing solution, blue stains are frequently formed, owing to the reaction of these two solutions occasioning the formation of Prussian blue. Blue patches may also be produced by using too acid a developing solution, or too thinly iodised a collodion.

Enquirer.—The occurrence of "pin-holes" in collodion negatives may arise from many causes; the most common are—the bath being over-saturated with iodide; this is remedied by adding a few ounces of a 40-grain solution of nitrate of silver; the collodion being used too soon after iodising, and before it has quite settled. A potassium collodion is peculiarly liable to this fault.

A. L. A.—The picture sent is by no means a bad one: if anything, a little less exposure might have improved it. Some of the foggy appearance may be due to the lens, which, owing to the number of reflecting surfaces, and the long time it requires to produce an action, is very liable to produce the effect of fog. You may obtain darker tones by printing deeper, and keeping longer in the toning bath.

A. Burr.—We do not think that you can get any double combination lenses with mountings much lighter than the old-fashioned style: in this respect the optician and brass mounter is far behind the cabinet maker in rendering the apparatus sufficiently light and portable for the present race of amateur photographers. A light and rigid substitute for the usual heavy brass mount is much wanted.

Dr. O.—The reduction is owing to the charcoal which you placed in the solution. It is an old experiment to place a stick of freshly-burned charcoal in a solution of nitrate of silver, in the dark. In about a week's time, metallic silver will be seen to be reduced on the charcoal, either in the form of a bright coating, or in long needle-shaped crystals.

Optical.—We presume our correspondent means *refracting* stereoscope when he speaks of a *refractory* stereoscope, although the latter term would be very applicable to some of the cheap instruments now to be met with. Professor Wheatstone was the inventor of the refracting stereoscope as well as the reflecting instrument.

In a Fix has a stock of negative collodion which he wishes to convert into positive. The most advisable plan will be to add tincture of iodine until the collodion assumes a full yellow or reddish tint; and if the intensity of the positives should still be found too great, add nitric acid to the bath, drop by drop, until it works properly.

F. L. M. M. (Devon.)—One or two drops of canada balsam in an ounce of spirits of turpentine will make a very good varnish for pouring over collodion positives before colouring them. If the colour *bites* too deeply, add more turpentine.

A Member.—We must decline taking any part in such proceedings. They will not add much to the credit of either party, and our advice would be to stop at once.

Halcyon.—The plate should be *well* washed, or the picture will fade. By using a collodion specially prepared for the purpose, the film will not wash off. You will see advertisements to that effect in our advertising columns.

Henry.—Iodoform diminishes the intensity of collodion, and prevents the proper formation of the half-tones of the negative. For this reason we think its employment injudicious.

William F.—It is imprudent to mount positives with paste, as this substance has been shown to exercise a very prejudicial effect upon the stability of the photograph. Thin glue, applied hot, will be far preferable.

F. R. S.—The article referred to has not yet appeared in any English journal. It would be too heavy and uninteresting for insertion in full in our pages: we may, however, give an abstract of the article.

A Calotypist.—More acetic acid is required in the exciting and developing solution. Do not excite with gallo-nitrate, but only with aceto-nitrate of silver.

T. P.—1. The metallic spangles are caused by the presence of too much nitric acid in the developing solution. 2. Your prints will probably be rendered darker by ironing them in a rather damp state.

J. B.—We are not aware of the existence of any patent which can prevent you taking pictures on ivory.

Collodion.—Your collodion is too thin: allow longer time to elapse before it is poured off the plate, or use a thicker collodion.

H. M.—See M. Le Grice's paper in the present number. Your bath seems as if it were alkaline; add a little dilute nitric acid to it.

J. T. B.—We will communicate the query, and, as soon as we receive an answer, will give the desired information.

R. H. W.—One drop of nitric acid added to one ounce of water. Add this solution to your bath in quantities not exceeding one drachm at a time.

Beginner.—1. Use a slow collodion containing free iodine. 2. No. 3. We cannot answer such questions.

Adeline.—If our fair correspondent will send us her portrait, we will say whether we think photography the best employment for her spare time.

Querist.—Apply to a card maker or wholesale stationer, who will *hot-press* your pictures at a moderate expense.

Janet.—Your query was answered in one of our previous numbers.

V.—Use a solution of gum damma 3 drachms, in mineral naphtha 3 ounces.

Mary.—The effect you describe cannot occur if pure chemicals are used.

H. S. I.—Received with many thanks. A proof will be sent in a few days.

M. and H.—Received.

Communications declined with thanks.—A. B. C.—Q.—A Beginning.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—B. L. N.—Correspondent.—In a Fix.—B. T. O.—Abra.

In Type:—Sir J. F. W. Herschel.—A. Watt.—H. M.—A. R. P.—G. A. M.—H. and J. Walter.—W. H. Burnand.—C. H. Paine.—B. M. Brackenridge.—M. A. Root.—J. S. Overton.—G. R.—Knostian.—W. L.—G. H. W.—I. W. W.—F. Debenham.—X. X.—H. M.—Inquirer.

Cases for Binding Volume II. have been prepared, price 1s. 6d. each. Subscribers may have their copies bound by the Publishers, in the usual manner, price 2s., including the cloth case.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 52.—*September* 2, 1859.

THE Second Volume of the "PHOTOGRAPHIC NEWS" is concluded with the present number. Twelve months have elapsed since we entered on the publication of this new periodical. Several authorities predicted our failure, from the fact of our serial addressing only a limited section of the public. Fortunately, we were sufficiently confident in the soundness of our opinion on this point, as not to be deterred from our purpose by any sinister forebodings as to the probable result of our attempt to establish a new medium of communication with the great body of photographers; still there was, naturally, a feeling of some anxiety connected with the undertaking, lest we might have formed an erroneous estimate of what was required at the present day by the particular class we addressed. We are now enabled to speak with the confidence inspired by facts, and it is with real pride and pleasure that we inform our readers that the excellent position the "NEWS" assumed at its very commencement has gradually strengthened, and that it continues steadily to progress in the estimation of photographers. Within a month after its foundation it had taken the foremost place in photographic literature; since then every month has seen a large additional increase in the sale in this country, and the slower, but equally certain, growth of the circulation in our colonies, in India, and, to some extent, on the Continent. We mention these facts for the purpose of expressing our grateful acknowledgments for the support we have received; at the same time, we cannot refrain from pointing out that our exertions have not merely been of service to photographers, but have tended to raise the character of photography in public estimation. Before the establishment of the "PHOTOGRAPHIC NEWS" the public were almost entirely ignorant of the position to which photography had advanced, or that its importance was such as to require a journal devoted to its interests. The editors of newspapers ignored the existence of such periodicals, and it was not until this journal made its appearance that they recognised the fact by frequent quotations from its pages; thus proving that the "NEWS" had done what other journals of similar character had failed to do, viz,: made photography a subject of interest to the public generally.

With respect to the character of its contents, we may leave that to the judgment of our readers, merely observing that while we have never failed to record every incident connected with photography in England likely to interest them, we have always endeavoured to keep them well informed on matters of science and art occurring on the Continent—which knowledge would not be likely to reach them through any other channel—by engaging the services of one of the most distinguished *savans* in France; we have also opened our columns to communications from correspondents to the fullest desirable extent.

As regards the future, we propose to continue the series of articles under the head of "The Amateur Mechanic," the letters we have received from many of our readers demonstrating that they are received with favour. In addition to this, and in order to make the "PHOTOGRAPHIC NEWS" of greater value to beginners, several valuable series of articles will be introduced into the new volume, by means of which they will be readily enabled to master the preliminary difficulties of the art. A second series of "Lessons on Chemistry" will be commenced, which, being fuller and more comprehensive than those formerly given, will be equally useful to our old and new subscribers.

In conclusion, we cannot omit to express our warm acknowledgments to those eminent photographers who have, both privately and otherwise, favoured us with suggestions calculated to be of service to those practitioners who have not yet acquired an extensive acquaintance with the art; and also to those who have favoured us with information on minor matters of interest to the readers of the "NEWS." We have pleasure in expressing our obligations to our correspondents, and trust that these kindly communications may be continued in the future as in the past—a repertory of valuable information; and that while we labour zealously to maintain the reputation of the journal intrusted to our charge, we may continue to receive the assistance of all who are interested in the progress of photography, and who are desirous of fully investigating the bearing which kindred sciences may exercise upon it. It will ever be our object to give the utmost publicity to every new discovery and to every important improvement, and thus to render our serial the veritable organ of PHOTOGRAPHIC NEWS.

DESCRIPTION OF A PLAIN OR WAXED PAPER PROCESS IN PHOTOGRAPHY.

BY JESSE MITCHELL, ADJUTANT 1ST NATIVE VETERAN BATTALION.

The following paper, extracted from the reports of the Madras Photographic Society, will form a valuable addition to the paper on a similar process from the pen of Mr. W. H. S. Crawford, given in a recent number:—

So much has been written on the paper processes that the subject would appear to be exhausted. Nevertheless, a good paper process, easy to manipulate, and applicable to all situations, appears to be still a desideratum. I have, therefore, at the request of our Honorary Secretary, undertaken to describe my mode of operating, and, I believe, that any one who faithfully follows these directions will, after a little practice, find no difficulty in producing, at least, tolerable negatives. Skill in photography, as in any other art or science, is only acquired by practice, and no reasonable man should feel annoyed if, in his first attempts, he fails to produce as good pictures as they can do who have practised assiduously for many years.

This process is a modification of the original waxed paper process of Le Gray, but it is equally suited to unwaxed papers. As the manipulation of unwaxed paper is much the easiest, and the results so much alike that the operator himself cannot, after a time, say which was taken on waxed, which on plain paper, I shall confine myself to a description of the latter process, giving afterwards such additional directions as may be necessary to adapt it to waxed paper.

In photographic operations, absolute cleanliness is an essential element of success. It is not sufficient that the photographer's hands, for instance, be mechanically clean, they must be chemically so; therefore, when he is about to select his papers, he should not be satisfied with the usual washing with soap and water, but should rinse them afterwards in a good quantity of clean water, lest the soap do that mischief it was intended to prevent. This applies still more strongly to the trays used in the various stages of the process. The tray used for iodising the paper should be used for that purpose alone; or if, from the paucity of apparatus—which, in this country, is not always procurable—he is compelled to use it for the exciting solution also, that is the greatest liberty he may take. The exciting dish must never be used for developing, and the dishes for developing solutions should not be used for any other purpose, except washing the paper after it is excited, in which case, if clean, they are not likely to do any harm. After being used with gallo-nitrate, they should be washed as soon as possible in abundance of clean water; and if the gallo-nitrate solution decomposes rapidly when placed in them, they must be washed with a weak solution of cyanide of potassium (5 grains to 1 ounce of water), and with plenty of clean water afterwards. The trays for hyposulphite cannot be used for any other purpose, except for washing the finished negative. The photographer will also find it advantageous to have separate measures and funnels for his aceto-nitrate and gallic acid solution.

PAPER.

The paper used in this process is Canson's thin negative. It is not without imperfections, such as unevenness of texture and minute holes, which allow the exciting and developing solutions to pass through and stain the back of the negative. To the beginner these things are not of much importance, as he must expect to spoil a few papers; but when a little more advanced, he should examine his papers carefully by a strong light, rejecting any that have the imperfections above noted, which need not, however, be thrown away, as the best will do for waxing, which fills up any very small holes, and the remainder will do for positives. The papers should be cut of the same width, and half an inch or so longer than the camera slide. One side of the paper is smoother than the other, which is best ascertained by holding it so that the light falls upon it obliquely; this should be marked, in two opposite corners, with a capital letter, which better defines the side on which the mark is made than a circle or cross.

IODISING.

The solvent may be either whey or distilled water. I believe the former produces the most dense skies, and a greater opacity generally in the dark parts of the picture; it is, however, somewhat troublesome to prepare. The following method of obtaining it is, perhaps, as good as any:—

Let pure milk from the cow stand until it is sour; for each quart of milk beat up the whites of three eggs; add these to the milk, in any convenient vessel; porcelain is best—if brass or copper utensils be used, they should be well tinned. Boil gently over a slow fire for a few minutes, and the caseine will be taken up by the coagulated albumen. When cold, filter through a double fold of cambric, and then through bibulous paper; the latter is a tedious process unless the operator has a large funnel, which he can fill and leave whilst he is attending to other matters. If properly made, it should be clear and transparent, and of a straw coloured tint.

To each ounce of whey or distilled water add the following ingredients:—

Iodide of potassium	7·5	grains.
Bromide of potassium	2·5	,,
Cyanide of potassium	·4	,,
Chloride of sodium, dry (table salt) ...	·5	,,
Sugar of milk	12·	,,
Crystallised honey (from the bottom of a jar)	5·	,,

Dissolve, and add to the mixture as much re-sublimed iodine as will produce a brown sherry colour; try 10 or 12 grains to the quart of 40 ounces, and if that is found insufficient, add more, as the exact quantity is of no importance. The iodine being rapidly extracted from the solution by the starch in the paper, will require to be renewed occasionally, the necessity being indicated by the paleness of the solution. It is some hours before the whole of the iodine is dissolved.

Filter the above solution into a dish to the depth of one inch, or more if the dish is deep enough. Take a paper by two adjacent corners and place the other end upon the solution so as just to touch it; without pause lower the hands gradually and carefully to exclude air bubbles, for the better seeing of which the iodising tray should be placed between the operator and a window. Let the paper lie for a moment until it is wetted, then take it up by the corners nearest to you, and place the other side of the paper upon the solution in the same way. Then by the help of a bent glass rod, or by tilting the tray, cause the solution to flow over the paper. Should air bubbles be present, they will be indicated by that portion of the paper remaining uncoloured. Put in as many papers as the tray will hold without crowding. When all are in, remove in succession the bottom paper to the top, turning it as you do so; this will enable you to see if the whole have been properly immersed. The dish should be shaken occasionally to prevent the papers adhering to each other, which they have a tendency to do, and which is shown by light patches where the free access of the solution has been prevented. The papers may be immersed from two to three hours, and then hung up to dry.

(To be continued.)

PHOTOGRAPHY IN NATURAL COLOURS.

BY M. E. BECQUEREL.

Many communications having recently appeared in our columns relative to this subject, we are induced to lay before our readers the following interesting paper *in extenso*; as, although it was published some time back in the conti-

nental journals, we believe it has never yet appeared in an English periodical:—

I have frequently been asked to communicate my researches on the reproduction of colours by means of the chemical action of light, and I proceed to do so with pleasure, although these experiments extend back several years, and are as yet scarcely applicable to the practice of photography; but as the matter possessing the remarkable property of receiving coloured impressions by means of light is also susceptible of very curious physical modifications, I shall offer some details of the process, in order that persons interested in the study of the chemical action of light may easily reproduce the different effects that I have succeeded in obtaining. There are a number of substances sensitive to the chemical action of light. Some exhibit either a partial or total decomposition, as certain compounds of silver, lead, mercury, gold, platinum, &c. Others require the presence of substances which react upon them, as chlorine in conjunction with hydrogen; chromic acid, with organic matters; guaiacum in conjunction with oxygen, &c. But in general, when the decomposition is either partial or total, or if a chemical action is exhibited, the colour of the impressionable substance changes, exhibiting mostly but a monochrome shade, depending on the nature of the newly-formed compound.

If we take, for example, the iodide of silver, which loses its yellow colour when exposed to the action of light, the new tint exhibited is independent of the refrangibility of the active rays. In order the better to study the effect produced, a solar spectrum must be used—that is to say, the image formed by the dispersion of the solar rays by means of a prism; and if this image is received on a surface covered with iodide of silver, the latter begins to colour itself on the violet portion of the spectrum, and even beyond the violet, and afterwards in the blue; that is to say, in the most refrangible portion of the visible spectrum. But the ultimate colour of this matter, produced by the action of the light, has no relation whatever to the colour of the active portion of the spectrum. In using other substances, it is found that the chemical action is manifested in different portions of the spectrum, and we are therefore led to an analogous conclusion. The preceding observations may be summed up as follows:—That every substance is affected by rays comprised between different limits of refrangibility, and that the reaction once effected, there is generally but a single tint produced, not corresponding with the tint of the active rays. However, amongst the different substances experimented upon, there is one which appears to exhibit several shades of colour under the action of the spectrum, namely, chloride of silver. When prepared under ordinary conditions it assumes a violet tint, under the action of diffused light, and then becomes of a brown colour; if exposed to the action of the luminous spectrum, it begins to colour itself in the ultra-violet and violet portion; and if the action is maintained for some time, and there is sufficient diffused light in the dark chamber, it assumes, in the red portion of the spectrum, a red brickdust tint, as first observed by Scheele, Herschel,* and Hunt,† who have studied the action of light on different sensitised papers, and have each observed that chloride of silver exhibits this red tint in the red portion of the spectrum.

It is known, on the other hand, that chloride of silver, which has become coloured violet, assumes, if warmed, a red tint, exactly similar to that observed in the red portion of the spectrum. It may be asked if this latter effect is not the result of the heat. At all events, since chloride of silver, when it begins to colour, becomes slightly violet, and begins to colour in the most refrangible portion of the spectrum, and, on the other hand, since it assumes a brick red colour in the least refrangible portion, it would be a rather curious coincidence to see the two extremities of the photogenic impressions of the spectrum assume the one violet in the violet, the other red in the prismatic red. I commenced the study of this subject in 1838 and 1839, and at first imagined that the effect of colouring produced in the visible portion of the spectrum was due to the calorific action, but have since discovered that it was not so. At first I endeavoured to find under what conditions these effects might be most certainly obtained. If the chloride of silver be not obtained by double precipitation on the surface of the paper, but precipitated from solutions in a glass and then deposited upon a surface, such as glass, porcelain, &c., and if this chloride has not been previously exposed to the light; as soon as the solar spectrum is exposed to its surface it only becomes affected in the ultra-violet portion, and assumes only a slightly violet tint, which gradually deepens. On the other hand, nothing is produced in the visible portion of the prismatic image. But if a perfectly pure chloride be used without any excess of nitrate, and this chloride be previously sensitised, the effect is very visible. In the violet the tint deepens by degrees, and is similar to what would be produced in the diffused light; in the red portion, however, a slight rose tint is obtained, but no very visible effect is produced in the yellow or green portion, in which, however, may be observed a faint discoloration. If the chloride be obtained on the surface of paper plunged successively in salt water and then in a bath of nitrate of silver—and there should be an excess of nitrate—the effect is not the same. In this case, either the sheet of paper has *not* been previously exposed to the light, and has no chemical action visible except in the ultra-violet portion, or the paper *has* been exposed to the rays and become sensitive in the visible portion of the spectrum, from the blue to the red. There is, then, an *action of continuation*, and the effects of colouring are weak if at all observable.

(*To be continued.*)

* Bibliothèque Universelle de Genève, 1839, tome xxiii., page 185.
† Id. tome xxvi., page 407.

INSTABILITY OF CARBON POSITIVES.

It is well known that the Duke de Luynes has founded a prize of 8,000 francs to be given to the person who shall discover a method of printing permanent photographs. Positives printed with chloride of silver fade in time; that is, unfortunately, a fact which cannot be contested (?); there are those which resist more than others, arising from the manner in which they have been fixed, washed, and so forth. In any case, we repeat, it is a pure question of time. From the moment it was admitted that chloride of silver prints had not the character of permanency required by the terms of the Duke de Luynes' prize, all efforts were directed in another way; it was sought to produce prints by means of carbon, or, vulgarly speaking, charcoal. Messrs. Pouncey, Garnier and Salmon, and Brebisson, succeeded in producing by this process some remarkable proofs, and, as all the world said, permanent. Well, it is now proved to us, as clearly as daylight, that these proofs are not more permanent than those with the chloride of silver. How, it will be said, is carbon capable of change? Can carbon, which is the basis of printing ink, be compared with chloride of silver simply blackened by light? Has it not shown what it is capable of doing from the most ancient times? It is not the carbon which we consider capable of change. If this substance were in direct contact with the paper, as in the case of an engraving, there is no doubt a guarantee might be given with each print that it was permanent. Unfortunately, it is not thus. The carbon is separated from the paper by a film of gelatine or albumen of a greater or less thickness; hence it is evident that, if you destroy this intermediary, the carbon, no longer adhering to the paper, must necessarily disappear.

It is in vain that persons may contest this fact; there is a very simple method of verifying it, which is as follows:—Immerse the proof in a bath composed of water and chloride of lime; the action of this bath will dissolve the albumen which holds the carbon, which, deprived of its support, will

disappear in the liquid, and the sheet of paper will be restored to its original whiteness.—*Revue Photographique.*

[Even supposing that this result would arise from placing a carbon print in a solution of chloride of lime, we do not see that this militates against the value of carbon as a permanent printing agent, inasmuch as there is no necessity for our putting our prints in such a solution. It would be more to the purpose to show that the atmosphere, or gases therein (ozone, &c.), were capable of destroying the glutinous substance which holds the carbon against the paper. There might then be good reason to say that carbon prints were not permanent.—Ed.]

THE BRITISH ASSOCIATION AT ABERDEEN.

In our number for July 22nd (p. 238) we drew attention to the photographic exhibition which was intended to be opened during the meeting of this learned body. In that notice we mentioned the 1st of September as the last day for receiving photographs; we are now enabled to announce that the time for receiving such contributions is extended to the 6th inst. Pictures will be received unglazed if required, although framed ones will be preferred.

We understand from the excellent honorary secretary, Mr. White, that the exhibition will be likely to prove a most successful one; and when it is remembered that the presence of H.R.H. the Prince Consort, as President of the Association, cannot fail to attract a goodly gathering of visitors, we feel that nothing more than a simple statement of this fact is necessary to induce photographers to send largely of their best.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *29th August*, 1859.

MM. Labourdette and Champion presented, a few days ago, to the *Société Philomatique* of Paris a note upon the *Iconography of Fungi* (*iconographie des champignons*). As this note is very short and intimately connected with photography, I will give it here in the words of the authors:—

"In systematic works the science of mycology is based upon such subtle characters, that the application of these characters to enable us to classify species becomes almost impossible. Any natural subject can be known by its physiognomy; it is the physiognomy which dictates in the first place, and the mycological characters, in spite of their well-recognised importance, are, after all, only indispensable elements of critique. The study of the *sporula* of fungi furnishes us, certainly, with a precise botanical character of any mushroom, but does not give us any notion of its size, form, or aspect: it is, however, absolutely indispensable to know this aspect, without which we could acquire no idea of the species or genera. We insist more especially upon this point, as we think that at the present day the application of microscopic elements to classification is abused. If we have only to consider these elements in the classification of fungi, we should commit a great error, and we might just as well endeavour to classify mammalia by characters obtained from the globules of the blood or the zoosperma.

"An illustrious zoologist, M. Schlegel, entitled a well-known book, '*Essay on the Physiognomy of Serpents.*' We think the time has come for writing an '*Essay on the Physiognomy of Fungi.*' As Persoon and Leveillé appear to have foreseen, it is necessary to group them by means of characters that can be appreciated by the naked eye, or according to their natural attitudes, and the circumstances in which they develop themselves. . . . One of us (M. Labourdette) has for some time past had the intention of publishing such a work. But the pencil is not able to delineate the minute details which are observed on the surface of fungi; the physiogonomy of the vegetable is quite lost in these drawings. But that which the pencil cannot do photography achieves with ease, and M. Champion has undertaken the photographic part of the work we propose.

"To-day we have the honour of presenting to the society a few proofs of fungi, natural size, which will speak for themselves and demonstrate forcibly the great importance of this new application of the art. We will only add that this application of photography has required a few modifications in the mode of operating which M. Champion will make known later."

As I have frequently had occasion to remark, the greatest field, or, at least, the most interesting and the most glorious field for photography, is its application to natural history. Most of the *fungi* cannot be preserved in an ordinary herbarium. The only way in which they can be kept at all is in spirits of wine, or some other liquid of the sort, which, however, soon spoils their appearance by dissolving some of their elements. I judge from the present collection in the *Jardin des Plantes*, where it has been found necessary to make wax models of these interesting vegetables, that the inquiring portion of the public which visits every Sunday and fête-day this noble institution, may have some idea of them.

I also know from experience that of all plants the most difficult to classify by the student are fungi and grasses. If photography comes to our aid in this, the difficulty will disappear almost entirely. How great an advantage would it not be, indeed, to the botanical or medical student, if he could buy for a few shillings photographic proofs of the principal *fungi* of his country!

M. Bertsch has applied photography with considerable success to the representation of microscopic objects. To-day the *Illustration Française* gives an admirable and flattering article upon this subject, with four engravings from M. Bertsch's microscopical photographs.

But, up to the present day, these admirable proofs are of no use. M. Bertsch certainly does not perceive the road he must take if he wishes for a lasting success and well-deserved praise. He must not continue to photograph here one object, there another; one day an infusoria, the next a fly's eye, or a flea's leg, &c. He must take for subjects a class of microscopic plants or animals, and photograph the whole, or, at least, the most important subjects of this class, if he desires to be really useful to naturalists. As to the proofs he has produced up to the present moment, they are, certainly, admirable examples of photography, and show what he can do; but they are, scientifically speaking, of little more use than a child's toy.

It will, perhaps, amuse some of your readers to know how photographic journals are composed abroad. We take the best of them. Here are the contents of the *Bulletin* of the *Société Française* for the last month:—

1. "On dryness, darkness, and cold, as preservatives against the alteration of proofs, by Dr. George Wilson." (From a London contemporary.)

2. "Researches on different luminous effects, &c., by M. Edmond Becquerel." (Communicated.)

3. "On thermography, by M. Gaultier and Claubry." (Idem.)

4. "Method of toning by alkaline salts of gold, by Mr. Smith." (From a London contemporary.)

5. "On the Fothergill process, by Mr. Alfred Keene." (From a Liverpool contemporary.)

6. "Impression without salts of silver, by M. Heineken." (From a London contemporary.)

7. "Remarks made in Australia on photographic processes." (From a London contemporary.)

8. "Note on direct positives, by Mr. Traill Taylor." (From a London contemporary.)

9. "On varnish for collodion proofs, by Mr. J. Sang" (From a London contemporary.)

10. "Alteration of glass by exposition to light, by Mr. Gulliver." (From the *Photographic News.*)

11. "On the application of photography to magnetic and meteorological observations, by Mr. Glaisher." (From a London contemporary.)

12. "Decomposition of nitrate of silver by freshly-calcined charcoal." "The solution of nitrate of silver, whether neutral or acid, and chloride of silver dissolved in ammonia, are easily decomposed by charcoal that has been recently calcined. Metallic silver is soon precipitated, and sometimes crystallises." (*No author's name.*)

13. "Method for preserving valuable proofs, by Mr. Browning." (From the *Photographic News.*)

Of these thirteen articles, ten, and probably eleven, are extracted from English papers; two alone are original.

M. Henri St. Claire Deville informs us that in the south of France, between Arles and Toulon, there exist some extensive deposits of iron ore, which have long since been abandoned, on account of the considerable quantity of alumina that it contains. Berthier, who formerly made an analysis of this ore, found—

Alumina	52·0
Peroxide of iron	27·6
Water	20·4
Traces of chrome	
	100·0

The mineral in question was therefore classed among the *giobertites* by M. Dufrénoy. M. Deville, who has analysed another specimen taken out of the rock itself, found—

Crystallised carbonate of lime	12·7
Peroxide of iron	34·9
Alumina	30·3
Water	22·1
	100·0

Moreover, he discovered in it traces of silica, phosphoric acid, titanic acid (?), and notable quantities of the rare metal *vanadium.*

After having calcined the mineral with caustic soda and treated it by water, to wash out, as he thought, the alumina, M. Deville remarked that the alkaline liquid thus obtained deposited regular octahedral crystals (having angles of 109° 15′ or 109° 20′), which were colourless, and which he took for a compound corresponding to the octahedral aluminate of potassa discovered, some time back, by M. Fremy. But on analysing these crystals, he remarked that they became red by hydrochloric acid and disengaged chlorine, which immediately made M. Deville suspect their real nature. They turn out to be a vanadiate of soda, containing 47·8 per cent., or 12 equivalents of water. They are more readily obtained by covering the liquid which deposits them with a layer of alcohol.

The author thinks that vanadium may become, one day or other, largely employed in the arts, especially in porcelain manufactories, on account of the fine green colour it is susceptible of giving to certain enamels. He thinks it is far commoner than is generally imagined, and, at any rate, his own experiments show that large quantities of this hitherto rare metal exist in the ancient clay deposits of the south of France. M. Deville terminates his paper by reminding us, that although vanadium has, up to the present time, been looked upon as a great rarity, the estimable works of Sefstroem, Berzelius, MM. Wöhler and Rose have given us a very complete history of the properties of this metal.

Vanadium was on the *tapis* again last Monday at the Academy of Sciences here. M. Chevreul communicated a short paper by M. Bonvallet, who assures us he has been able to extract considerable quantities of vanadium, or rather vanadic acid, from the clays of Chantilly, but that he has not once met with this substance in the tertiary clays of the environs of Paris. The foreseen applications of this, comparatively speaking, new metal, tend towards the art of dyeing, but who knows but what important benefits may be gained by photography in the application of such a substance!

A certain parasite worm which inhabits the muscular tissue in the human species is at present, according to M. Virchon, very common at Berlin. This worm is the *Trychina spiralis;* it has hitherto been considered a zoological rarity.

M. Isidore Pièrre, who is well known on the Continent by his indefatigable researches in agriculture, has just made known the existence of butyric acid in various manures, and in the soil. This acid was discovered by Chevreul in butter; he recently found it again in the greasy matter contained in sheep's wool. M. Isidore Pièrre is the first person who signalises this product in the soil.

I regret to say the Paris papers announce the death of M. Boitard, one of our ablest naturalists; he died at an advanced age, and his loss will be much felt in the scientific world. Botany and entomology were the sciences in which he acquired most of his well-deserved reputation, and his name will be long familiar to students of natural history.

Photographic Notes and Queries.

CONVERTING POSITIVES INTO NEGATIVES.

SIR,—I should not venture to write upon this subject, as you have so many able correspondents upon all the various modes of operation in photography, had I not observed in your journal of late one or two articles which appear to be quite erroneous, both as to the means employed and the original inventor. My late friend, Mr. Archer, says: "Prepare a saturated solution of bichloride of mercury in muriatic acid, add one part of this solution to six of water; pour over the picture evenly, it will deepen the tones immediately, the picture almost disappearing, but in a few minutes a beautiful white picture will be brought out." This is the only and the first intimation we have of the process now called the alabastrine, and claimed now by so many; it, however, exclusively belongs to the late Mr. Archer, who communicated it to me so long since as 1850, and then published it in his book of the same year. There are many modifications of the above, but, without doubt, this is the best and the original mode. Many trials have been made to convert the positive picture into a negative, all of which have turned out more or less a failure. I now give a mode which has not been published, to my knowledge, by any one, based upon the above, and the credit, if any, of which I take, therefore, to myself, having for six years experimented therein—and assure all those who choose to attend to my directions that they may obtain a clear, sharp, and dense negative, at all times, from a good positive, having all the half tones and intermediate shades which render a picture more or less beautiful, as they appear or not; it possesses, also, this advantage, that you may show a party the picture at once as a positive and be certain that the paper proofs will be exactly like the one shown, which is not the case with the usual mode of taking negatives, and which can only be looked at by an experienced eye, and often, even then, is not at all the thing expected. After whitening the picture, as above described, next wash it in clean hot water, then take thirty drops of the liquor ammonia, P.L., and add about an ounce of distilled water; mix them intimately and pour evenly over the positive: continue to pour it off and on, when the picture will assume a dark tone and continue to darken until it arrives at a dense black, but still retains a semi-transparent appearance and never losing its half tones. Should the ammonia used once be used again, the picture will assume a purple tone, which will print better than the first. I must add, that in order to succeed in this process, the glass must be cleaned with even more care than usual, or the film will, to a certainty, be washed off the glass. After the tone required is obtained well wash in hot water again, dry spontaneously, and varnish.

FRED. DEBENHAM, C.E.

PLATE-CLEANING LIQUID.

Sir,—The following solution for cleaning glass plates will be found efficient and economical:—Dissolve two ounces of common washing soda in half a pint of warm water, and when the soda is dissolved—but not till then—add four ounces of common salt, or more, to make a saturated solution. Stir till dissolved, and bottle for use; adding an ounce of the finest Tripoli powder. After cleaning the plates with this liquid, be careful to wipe the edges with a wet cloth, and then with a dry one, to remove any portion of the solution that may adhere, and which will decompose the silver bath.

There is another mode of using the liquid, which saves a great deal of trouble when many plates are to be cleaned. Make a sufficient quantity, of half the above strength, and without the addition of Tripoli. Steep the plates in this for several hours, or all night, and take out one plate at a time, drain it, rinse it in a pan of clean water, rubbing both surfaces well with a wet cloth, rinse it again and stand on end. When a dozen plates have been thus treated, wipe them dry with one diaper cloth, and polish with another, when they will be found beautifully clean, with a surface of great brilliancy. The common glass requires more cleaning than the patent plate, and a longer soaking in the salt and soda solution, which can be used again and again to the last drop. X. X.

ECONOMISING THE NITRATE BATH.

Sir,—I have lately seen several letters in the different journals respecting the great waste of silver by photographers, one of which recommended the use of blotting paper for draining plates when removed from the nitrate bath. There is, however, a much simpler plan than this, and though a great many of your readers are no doubt acquainted with it, there are, I think, a good many who are not.

The plan is this:—Take the plate by one corner, and rest the opposite corner in a clean, dry, glass measure; then lean the corner you hold in your hand against the wall, and let it stand for a minute or so. The quantity of silver solution saved by this means, even from small plates, is quite surprising. H. M.

NEW DRY PROCESS.

Sir,—Permit me to make the following corrections in the article on a new dry process in your number for the 26th ultimo:—In section 3, line 9, for "their potation" read "thin potations." In section 9 place the comma (,) after "6 parts" and "1 part," respectively. J. B. Hockin.

ANSWERS TO MINOR QUERIES.

Mottled Appearance in the Waxed Paper Process.—*Ellab* writes that the first or second time he uses a new bath for sensitising waxed paper for the negative process, he is always troubled with patches of a paler colour than the other parts of the sheet. He is certain that it cannot arise from an insufficient time of floating on the silver bath, as he has tried all times of exposure to its action, and it seems to be worse the longer it is being made sensitive. The cause of this effect is, that the newly-made solution of nitrate of silver is not previously saturated with iodide of silver, and consequently when the sheet of iodised waxed paper is floated for any length of time on the bath, the iodide of silver which is at first formed, is partially redissolved; and this taking place to a greater extent as the sheet is kept longer in contact with the bath, fully explains our correspondent's remarks. The remedy for this will be, to saturate the silver bath with iodide of silver by adding about half a grain of iodide of potassium to each ounce of the bath, and well agitating, and allowing it to rest for a few hours before filtering.

Analysis of Collodion.—It may easily be ascertained whether the iodising solution contains iodide of cadmium, potassium, or ammonium, in the following manner:—Take a portion of the solution and add to it twice its bulk of pure anhydrous ether; if a precipitate is formed, iodide of potassium is the salt used. To another portion add a drop of ammonia; if a precipitate be formed in this case, there is probably cadmium present, whilst an absence of a precipitate in both cases shows that iodide of ammonium has been used.

TO CORRESPONDENTS.

In our next number will be given an important paper by Sir J. F. W. Herschel, Bart., F.R.S., fully illustrated with diagrams, and the commencement of a series of articles by Mr. Alexander Watt, on "Photographic Failures: their Causes and Remedies." Subscribers commencing with the new volume will shortly have presented to them a large-sized specimen of the progress of the Photoglyphic Art, which, by the courtesy of the inventor, Mr. H. Fox Talbot, is in active preparation. Notwithstanding the success which has attended our endeavours to make the thorny paths, which lead to excellence in our fascinating art, more easy of access to students, we shall by no means rest satisfied with our present position; and we therefore beg of our friends to enlarge still more our sphere of usefulness, by recommending the "Photographic News" *to those of their acquaintances who have not yet availed themselves of the information afforded weekly in our columns.*

R. A. W.—Will the gentleman who, in recent numbers of the "Photographic News," so graphically described, under these initials, a photographic trip up the Wye, kindly inform us where a letter may be addressed to find him?

The Stereoscopic Exchange Club.—Communications have been received from J. W. G.—H. H.—J. R.—A. N.—J. S. O.—S. S. B.—R. M.—H. W. L.—F. H. *Specimen Photographs* (without which no name can be inserted) have been received from the first five only of the above: as the complete list will be inserted in our next, attention is requested to this point.

V. C.—Try the following plan:—Add a few grains of metallic cadmium to your bath and boil it violently in a clean Florence flask for half-an-hour; allow it to cool, and filter; then add solution of carbonate of soda, drop by drop, until there is a permanent precipitate, and filter again. Next add acetic acid until there is a faintly acid reaction, and the bath *ought* to be in first-rate working order: if, however, it be not so, you must conclude that something has got into it which has ruined it, and the best plan will be to discard it in favour of a new bath.

J. W. L.—We are glad you approve of the apparatus. 1. Perhaps the lenses may require a little final adjustment; that can seldom be done correctly by the camera maker, but requires the operator to work with them once or twice to find out what is really wanted. 2. Nothing but ocular inspection on the ground glass will answer this question. 3 and 4. Perhaps the collodion had not perfectly settled.

Sunbeam.—We hardly understand your question. Of the two collodions you mention, the one which dries round the neck of the bottle in rough films, which are liable to drop off on to the plate, is of a *contractile* kind, whilst the other, which adheres closely to the neck, leaving an opaque film, is of the powdery variety. The former kind may be converted into the latter by many plans, and becomes spontaneously so on keeping.

W. R. H.—The process you have tried is not one of the best, and only very experienced photographers can hope to succeed at it. We should advise you to attempt the collodio-albumen or Fothergill process in preference; the results will be better, and will be obtained at a far less expenditure of patience and failures. We thank you for your offered diagram of the stand, and shall be very pleased to receive it.

A Constant Subscriber.—If there is any copyright attached to the lithograph, you would be clearly in error to attempt to sell a photographic copy of it; but if it be one to which there is no copyright, you will be entitled to sell as many copies as you please, provided you employed a lithograph of your own to take the copy from, and not the one sent to you by your customer, unless you had her express permission.

Bonaccord Amateur.—Your black varnish is too brittle; add something to it which will tend to give it toughness when it is dry, such as solution of India-rubber, or a few drops of drying oil. Some useful information on this point may be found on consulting the Index of our first volume.

Stupid Subscriber.—We think your bath is more to blame than yourself. Some organic matter has most likely found access to it, which has caused it to act as you describe. Treat it in the manner recommended to "V. C." above.

C. E.—Add a little acetic acid to the milk and boil it; filter from the curd. The clear solution will answer the purpose. Marion's paper is the one usually employed. When acetic acid is recommended, the best glacial should be used, unless some other sort is stated.

Goodwill.—The formula for the toning bath is not good. Try the one given in one of the first numbers of the present volume (by Θ), and you will have no difficulty in obtaining good dark brown or black tones.

W. G. P.—We are much obliged for the trouble you have taken to forward a copy of the paper. It had, however, previously appeared in the pages of a contemporary.

Muddle.—Theoretically, the divisions at the end of the beam would have more value than those towards the centre, but in practice the difference is found to be so slight that it is never regarded even in the best balances.

W. H. B.—The stereogram is very good; if anything, the tone is a little too red, but some persons prefer a rather warm colour. We shall be pleased to receive the particulars of the process.

Grateful.—Do away with the top and side curtains, except in very bright weather. From your letter, we fancy you have not light enough.

D.—A good lens, bright light, and chemicals, in first-rate condition, are all that are wanted to take instantaneous pictures.

H. D.—We regret to hear of your accident; we will communicate your kind offer of advice to our correspondent.

T. Raymond.—We will inquire.

Communication declined with thanks.—Nostrum.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—O. A. R.—P. L. F.—Rev. O. O.—Stereo.

In Type:—J. D.—S. B.—H. J. J.—S. Artridge.—J. S. Overton.—G. R.—Knostian.—W. L.—G. H. W.—I. W. W.—Inquirer.—C. H. Paine.—W. W. Burnard.—G. A. M.—H. and J. Walter.—Iota.—H. S. I.—One in a Fix.

Cases for Binding Volume II. have been prepared, price 1s. 6d. each. Subscribers may have their copies bound by the Publishers, in the usual manner, price 2s., including the cloth case.

_ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

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N.B.—A dash rule represents the *italics* immediately preceding it.

END OF VOLUME II.

LONDON: PETTER AND GALPIN, BELLE SAUVAGE PRINTING WORKS, LUDGATE HILL, E.C.